ACED
AUSTRALIAN COUNCIL OF ENGINEERING DEANS

AUSTRALIAN ENGINEERING EDUCATION STATISTICS

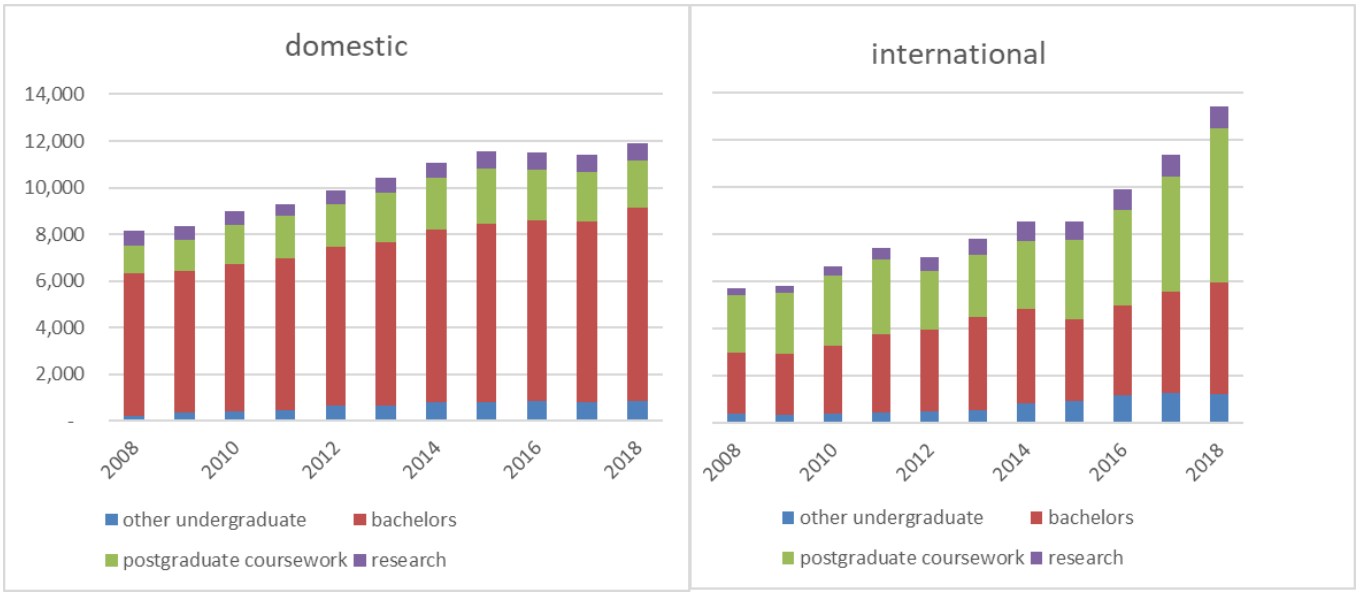
STUDENT AND GRADUATE NUMBERS

PARTICIPATION OF WOMEN

GRADUATE OUTCOMES

STAFF DATA

ACED MEMBER PROFILES



Graduations: Engineering & Related Technologies, 2008-18

MARCH 2020

KEY FACTS FOR ENGINEERING & RELATED TECHNOLOGIES, 2018

SYSTEM SIZE

Total enrolment: 119,433 students (115, 800 at the 36 ACED member institutions)
Student load: 80,089 EFTS (effective full-time students) - 78, 526 at the ACED institutions
Academic staff: approx. 4,200 FTE (full-time equivalent, excluding casual staff) at ACED institutions.

GRADUATES

award	domestic (% women)	international (% women)
Bachelor degrees (including Honours)	8,295 (15.3%)	4,696 (22.2%)
Postgraduate coursework	2,059 (18.0%)	6,531 (22.0%)
Research (PhD and Masters)	730 (29.1%)	926 (23.3%)
Other undergraduate awards	829 (8.8%)	1,246 (15.6%)
TOTAL	**11,915 (14.9%)**	**13,445 (21.6%)**

blue/red figures are >/< the previous year

Bachelor degree graduates were distributed approximately as below:

branch of engineering	domestic (% women)	international (% women)
aerospace (inc. civil aviation)	12% (16%)	11% (28%)
civil engineering	29% (15%)	26% (22%)
electrical & electronics	20% (9%)	24% (12%)
mechanical & manufacturing	21% (10%)	26% (10%)
process & resources (chemical & mining)	12% (29%)	12% (39%)
other (may be underestimated)	6% (no data)	3% (no data)

Six months after graduation, holders of undergraduate awards reported:

measure surveyed (during 2019)	engineering	all fields
median salary	$67,600	$63,100
in full-time employment	84.8%	72.2%
graduate overall satisfaction	74.4%	80.1%
employer overall satisfaction	89.9%	84.0%

More than 75% of the bachelor degree graduates in Engineering are likely to have commenced higher education study in the same institution, up to 6 years earlier.

The 89.9% employer satisfaction for engineering graduates was the highest of all fields.

COMMENCING STUDENTS

award	domestic (% women)	international (% women)
Bachelor degrees (including Honours)	14,283 (18.1%)	7,447 (18.7%)
Postgraduate coursework	2,212 (20.1%)	9,484 (19.2%)
Research (PhD and Masters)	732 (26.9%)	1,679 (27.7%)
Other undergraduate awards	1,707 (10.7%)	1,894 (12.7%)
TOTAL	**18,856 (18.0%)**	**20,504 (19.3%)**

Engineering enrolled 5.7% of all domestic commencing students starting bachelor degrees, up from 4.9% in 2017. This proportion was at least 6% prior to 2012.

63.4% of the domestic students commencing a bachelor degree in Engineering entered on the basis of their ATAR. 67.7% of this group had ATAR greater than 80.00, making Engineering the field of education with the strongest ATAR profile, and with the highest rate of school-leaver entry.

More than 75% of domestic students commencing a bachelor degree in Engineering are likely to complete a degree, in Engineering or in another field.

AUSTRALIAN ENGINEERING EDUCATION

FEBRUARY 2020

1. INTRODUCTION

This report and appended data tables are authoritative resources on the current size and performance of engineering education in the Australian higher education (HE) system.

The data cover the field of education 'FoE 03 Engineering and Related Technologies'[1]. This includes programs in 'Engineering' as recognised by the engineering profession, and 'Related Technologies' in aviation, maritime, and spatial sciences, including surveying. The latter are commonly provided within engineering faculties, and comprise a small proportion of the FoE 03 aggregates. All of FoE 03 is inferred here by the term 'Engineering' unless otherwise explained.

The data cover HE programs at Levels 5 (diplomas) to 10 (doctorates) of the Australian Qualifications Framework (AQF). An explanation is provided on how education programs map to these award levels and may be eligible for external accreditation by Engineers Australia.

The report provides domestic and international student data for the 2018 academic (calendar) year, sourced from Australian Government's Higher Education Statistics collections (HEdStats). Decadal trends are provided for national enrolments and graduations, and for the participation of women. Summary Indigenous student enrolments and completions for all award levels are also provided. For bachelor degrees (including Bachelor Honours degrees), information is provided on student admission profiles, success, retention and graduation (completion) rates. Selected data for other fields of education and all field aggregates are provided for comparison.

Graduate outcomes data, including employment rates, salaries and satisfaction rates, and employer satisfaction, are provided from the annual national surveys from the Department of Education 'Quality Indicators for Learning & Teaching' (QILT) program. The report includes comparisons of national means or medians for Engineering with those of other STEM fields.

Research enrolments, graduations and some outcome data are reported, but not research performance (such as competitive grants, publications and engagement).

Data on teaching loads and non-casual academic staffing for Engineering are provided.

HEdStats data are supplied by educational providers, principally the public universities that are members of the Australian Council of Engineering Deans (ACED). For Engineering, private HE providers and the Vocational & Training (VET) sector contribute a very small number of students and graduates. While providers comply with the Department of Education's submission requirements, they do not necessarily report all datasets entirely consistently with each other. Inconsistencies that impact on data accuracy and interpretation are noted in the text.

Appendix 1 Tables 14-16 provide summaries of enrolment aggregates, female participation, graduations, teaching load for each of the 36 ACED members. The range of programs offered by each including offshore is also provided. These data reveal the wide diversity of the Australian engineering education system.

Appendix 2 is a short summary of the student and graduate numbers from VET awards (Certificate III to Advanced Diploma) in Engineering and other related fields and disciplines.

[1] The Australian Standard Classification of Education (ASCED) defines 11 Fields of Education, plus 'Mixed-Field programs. Engineering and Related Technologies is FoE 03. See Appendix 1, Table 17 for the list of subfields in FoE03 and FoE02 Information Technology.

CONTENTS

Australian Council of Engineering Deans Inc.

The membership of ACED is a senior academic representative of each of the 35 Australian universities that provide professional engineering degrees accredited by Engineers Australia.

ACED's mission is to promote and advance engineering education, research and scholarship on behalf of the Australian higher education system.

Position papers and other information is the ACED website: www.aced.edu.au

Contact: Prof Doug Hargreaves AM, ACED Executive Officer d.hargreaves@qut.edu.au

2. AWARD LEVELS AND EXTERNAL ACCREDITATION BY ENGINEERS AUSTRALIA

Higher education programs in Engineering and Related Technologies are delivered at Level 5 (Diploma) through Level 10 (Doctorate) of the Australian Qualifications Framework (AQF).

Australian higher education providers are regulated by the Tertiary Education Standards and Quality Agency (TEQSA) and must align their programs with the level specifications and descriptors of AQF. All of the Australian universities that are members of ACED are 'self-accrediting' institutions: they have the power to offer educational awards in the fields covered by their TEQSA registration.

Providers of engineering programs also align their programs to the needs of the engineering profession.

Engineers Australia (EA) accredits[2] programs that deliver the educational qualification for entry to supervised practice in three occupations: professional engineer, engineering technologist and engineering associate (senior technicians), as listed in the following table:

Occupation and EA membership category	Award (minimum full-time equivalent academic years of study, post-secondary school)	AQF Level	International Accord
Professional Engineer	Master (coursework) (5 years) Bachelor Honours (4 years)	9 8	Washington
Engineering Technologist	Bachelor (3 years)	7	Sydney
Engineering Associate	Associate Degree (2 years) Advanced Diploma (2 years)	6	Dublin

EA specifies the accreditation standards as a set of 'graduate competencies' for each occupation, known as the 'Stage 1 Competency Standard'. These are benchmarked against those of the educational accords of the International Engineering Alliance (IEA)[3]. The EA accreditation process evaluates programs – specifically their delivery of the graduate competencies – against criteria covering the academic program design and implementation, and the provider's operating environment and quality assurance processes. Accreditation covers programs for up to five years from the year of evaluation.

Graduates of EA accredited programs are deemed to have met the Stage 1 Competency standard for the applicable occupational category, and thereby meet the required educational requirement for graduate membership of that occupation. Their qualification is also recognised as equivalent (in terms of educational outcomes) to those of the other signatories of the corresponding Accord.

Three matters that impact on the interpretation of the data in this report require further explanation:

(i) Since 1980, EA has required the accredited professional engineer qualification to be of at least four full-time study years' duration (or part-time equivalent) following completion of a Year 12 secondary school certificate. From 1980 to 2013, the majority of graduates at many universities were awarded their 4-year degree 'with Honours', based on merit. Since 2014 providers been required (for compliance with the Australian HE Standards) to configure their four-year degrees as 'Bachelor Honours Degrees' as defined in AQF Level 8. **Thus, the BEng(Hons) is now the 'standard' degree for entry to professional engineering practice in Australia.** Nevertheless, the data provided in this report aggregates 'bachelor degree' numbers to cover awards at AQF Levels 7 and 8. Appendix 1 Tables 15 and 16 list ACED members' provision of programs at these two levels.

[2] Engineers Australia's program accreditation process and criteria and the lists of accredited programs can be accessed at https://www.engineersaustralia.org.au/About-Us/Accreditation

[3] The IEA is a self-governed international organisation of bodies that each has their jurisdiction's responsibility for accreditation of engineering qualifications and standards of engineering practice. As at January 2020 the Washington Accord has 20 full signatories. The Sydney and Dublin Accords have 11 and 9 full signatories, respectively. See http://www.ieagreements.org/

(ii) Until the mid-2000's, coursework master degrees (AQF Level 9) in engineering were offered primarily to qualified professional engineers to advance their engineering and technical knowledge. These degrees were not accredited by EA.

Since the 2000's, more than half of the Australian university providers and some private providers have developed **'entry-to-practice master degree**' programs that are aimed at domestic[4] and international bachelors graduates with suitable engineering science degrees and other prior qualifications. These programs are accredited by EA to the Professional Engineer standard. The aggregated data for master (coursework) graduates presented here includes numbers for both types of master degree programs. Appendix 1 Tables 15 and 16 provide data on the numbers of programs and branches of engineering covered for each ACED member.

(iii) Research degrees (doctorates and masters at AQF Levels 10 and 9, respectively) are not considered by EA for external accreditation. However, some summary data presented here is aggregated across all masters degrees.

These overlaps in award designations and data classifications thus make it impossible to use these national aggregations to provide exact answers to questions like: '*How many domestic students were awarded an accredited Professional Engineering qualification in a given year?',* '*How many domestic engineering professionals are taking an advanced master degree?*', or '*How many graduates in Civil Engineering were there in a given year?* The report does, however, provide estimates and comments on such points.

Some ACED members provide HE programs at AQF level 6, mostly as Associate Degrees. These, and some Advanced Diplomas, may be eligible for EA accreditation if they meet the education requirements for the Engineering Associate occupation. Appendix 1 Table 15 lists the ACED providers of accredited programs at this level. The student enrolment and graduation data for programs at this level includes those data for programs that are not aimed at this professional outcome, but are intended primarily as pathways to bachelor degrees.

Vocational education and training (VET) providers offer awards in engineering primarily at AQF Levels 3 to 6. Most programs offered by the VET sector follow a 'competency-based' education and training model, rather than the curriculum model used in higher education. Competency-based Advanced Diplomas in Engineering may be eligible for consideration by the EA accreditation process at the level of Engineering Associate. Appendix 2 provides a picture of VET awards in engineering.

[4] Notably, the University of Melbourne and The University of Western Australia have ceased offering 4-year bachelors degrees, and have adopted a '3yr BSc +2yr MEng' engineering qualification model.

3. GRADUATIONS IN ENGINEERING AND RELATED TECHNOLOGIES

3.1 Graduations by award level

The total numbers of graduates by award level over 2008-18 are provided in Appendix 1, Table 1. Figure 1 summarises these numbers in four broad qualification levels: research (doctorate by research and research master), postgraduate coursework, bachelors, and other undergraduate awards (Associate Degrees, Advanced Diplomas and Diplomas).

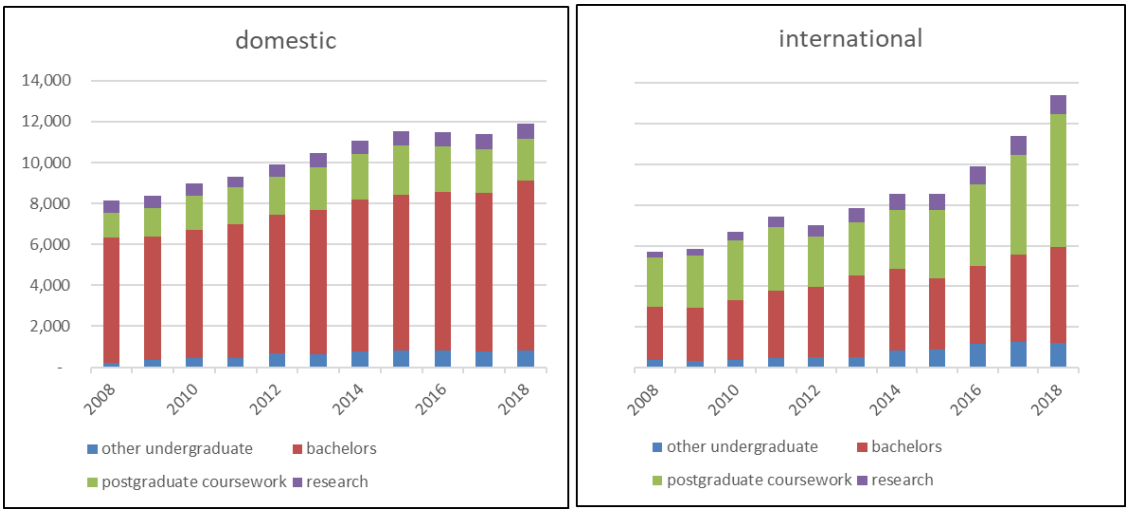


Figure 1 Domestic and international student graduations, 2008-18

An increasing number of universities are providing education programs offshore, at overseas campuses, or in partnership with a local institution. The institutions with offshore programs accredited by Engineers Australia are listed in Appendix 1 Table 16(b).

3.2 Graduations 2018: key points and trends

(i) *PhDs and Research Masters (domestic: 734; international: 925)*

- Graduations from research degrees have **more than doubled** over the decade, predominantly from the **quadrupling** of international PhD graduates. The latter have constituted the majority of research graduates since 2013.
- Australian research graduations by women have increased steadily, contributing **nearly 30% of the domestic total** in 2018. The corresponding rate for international students has fluctuated around 25% for the past seven years.
- In 2018 Engineering had **more than 11% of the total domestic** research degree graduations, and nearly **one quarter of the international** research degree graduations (not including doctorates by coursework), across all fields of education.

(ii) *Postgraduate coursework (domestic: 2,067; international:6,584)*

- Graduations (domestic and international) from master degrees continued to increase, strongly dominated by the **doubling of international graduates since 2015**. Most of this growth is attributed to graduations from accredited entry-to-practice master degrees.
- The participation of women (both domestic and international) in coursework master degrees is **consistently a few percent higher** than for bachelor degrees.
- Graduate certificates and graduate diplomas continue to be awarded mostly to domestic graduates, but have dropped in total (to 466, in 2018) by more than 45% since 2015. These awards are most likely to be exit points from advanced master degrees programs taken by practicing professionals.

(iii) *Bachelor degrees (domestic: 8,295; international: 4,692)*

- Domestic and international totals were both the **highest ever in 2018**, with the domestic figure up by nearly 10% on both 2016 and 2017 figures. There have been **annual increases of 9-12% in international** graduations since 2015.
- The totals include approximately 600 domestic and 450 international graduates of 3-year degrees (see Appendix 1, Table 2). Many of these are from non-engineering degrees, such as civil aviation. Some the engineering graduates (particularly the domestic group) at this level are likely to use their 3-year qualification as credit in a subsequent professional engineering degree.
- **Graduations by women constituted 15.3% and 22.2% of the domestic and international totals, respectively. Both figures are the highest on record**.

(iv) *Other undergraduate (domestic: 819; international: 1,246)*

- Associate Degrees and Advanced Diplomas were awarded to more than 600 students for the seventh consecutive year. Consistently, 80% of this total are domestic graduates. Many of the engineering graduates at this level use this qualification to articulate into professional engineering degrees.
- In contrast, 80% of the graduates of **engineering diplomas and enabling programs** were international. Many of these graduates will articulate to enrolments in bachelor degrees as discussed in Section 5.3. As reported in previous years, there may be more students on enabling (foundation) pathways, but who are not assigned to the engineering field of education.

(v) Professional Engineering qualifications

- From these data and other information, it is estimated that at least 8,000 domestic and 9,000 international students graduated from a BEng(Hons) or an entry-to-practice master degree in 2018.

3.3 Bachelor degree graduations by branch of engineering

Appendix 1 Table 2 provides details of bachelor degree graduations for 2018, by duration and 4-digit code sub-classification of Engineering & Related Technologies. These data provide some insight into the relative attractiveness of the main branches of engineering taken by domestic and international students. Figure 2 presents indicative trends[5].

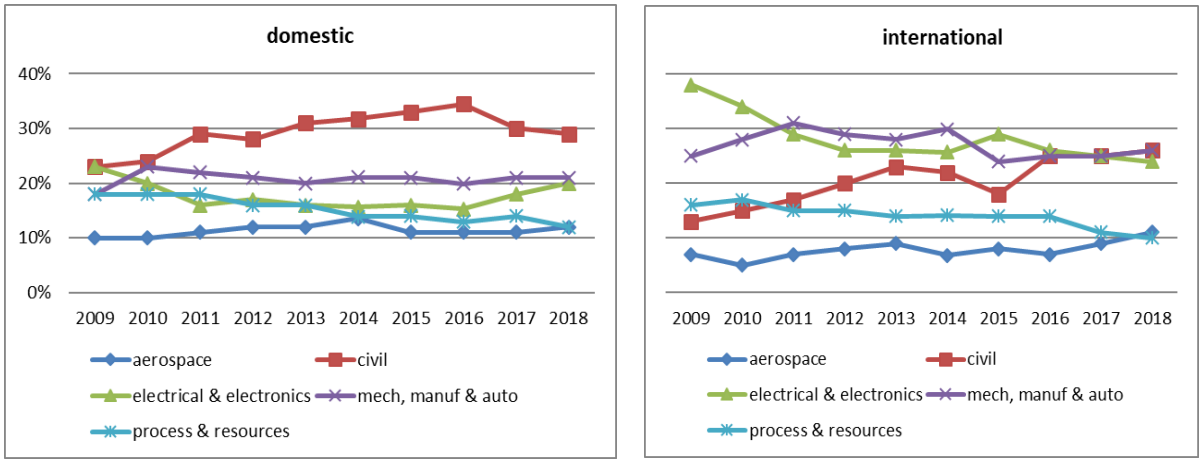


Figure 2 Indicative distributions of bachelor degree awards by branch of engineering, 2009-18

[5] These data are not definitive because several universities report their graduations against two generic ASCED codes (0300 and 0399). The trends shown assume that the universities that do report against the 4-digit codes are representative of the system as a whole. See Appendix 1 Tables 2, 15 and 16.

Key points:

(i) for domestic students, the proportion of civil engineering graduates dropped slightly in 2018, while the small increase in electrical/electronic engineering was balanced by decrease in the proportion graduating in 'process and resources'[6] engineering;

(ii) for international students, civil, mechanical and electrical/ electronics engineering graduations each continue to graduate about 25% of the cohort.

With more universities and other providers offering accredited entry-to-practice masters degrees, and in a wider range of engineering areas, further data collection and analysis are needed to determine the real trends in graduations by engineering branch, for both domestic and international cohorts.

[6] This combination is principally Chemical Engineering and Mining Engineering.

4. TOTAL ENROLMENTS AND STUDENT LOAD

4.1 Total enrolments

The data by detailed award level are provided in Appendix 1, Table 3, and summarised in Figure 3 for the broad award level categories. Total enrolments are the cumulative result of student commencements (Section 5) and successful progression and retention in their programs (Section 6).

The overall growth to more than 119,000 students in 2018 is entirely from international enrolments; their total increased by 9.4% from 2017, following a similar increase in the preceding year. The recent annual increase was due to 21% more enrolments in coursework master degrees (mostly entry-to-practice programs), 5% more enrolments in bachelor degrees and 10% increase in PhD enrolments.

Total domestic enrolments in 2018 declined very slightly from 2017.

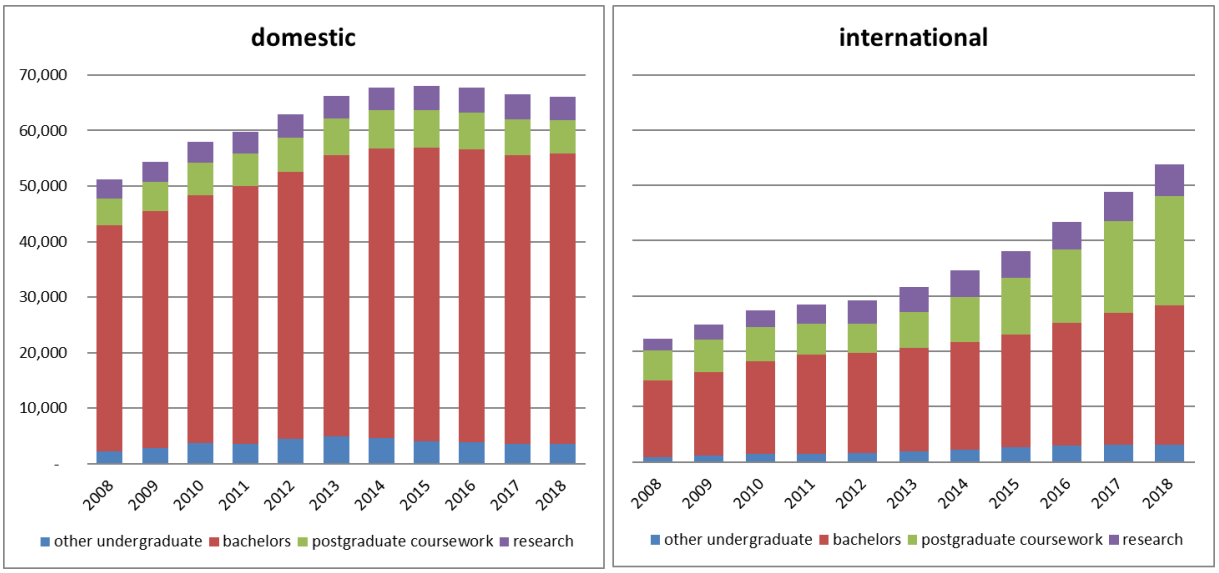


Figure 3 Domestic and international student enrolments, 2008-18

4.2 Student load

Funding for teaching and research training is normally based on 'taught student load'. The unit of measurement is one 'effective full-time student (EFT)' in the identified field of education. The following table summarises the total load for the Engineering & Related Technologies field over the last four years:

cohort year	doctorate	master	other p/g	bachelor	other u/g	enabling	non-award	total
domestic 2015	2,588	3,114	629	35,134	1,521	46	58	43,087
domestic 2016	2,695	3,249	546	34,783	1,455	7	51	42,787
domestic 2017	2,721	3,164	469	33,730	1,437	5	61	41,587
domestic 2018	**2,514**	**2,888**	**457**	**33,545**	**1,390**	**3**	**45**	**40,839**
% change v 2017	-7.6%	-8.7%	-2.6%	-0.5%	-3.3%	-40.0%	-26.2%	-1.8%
total 2015	6,207	10,931	749	49,765	2,529	46	975	71,201
total 2016	6,440	13,264	662	50,828	2,600	7	723	74,525
total 2017	6,661	15,714	594	51,272	2,659	5	378	77,284
total 2018	**6,786**	**17,813**	**563**	**52,055**	**2,512**	**3**	**358**	**80,089**
% change v 2017	1.9%	13.4%	-5.2%	1.5%	-5.5%	-40.0%	-5.3%	3.6%

The load attributed to **non-university providers** in 2018 was 1,396 EFTs, less than 2% of the total, but slightly higher than in 2017. Earlier year totals, and the 2018 detailed data for 4-digit ASCED sub-codes (corresponding to the branches of engineering) provided in Appendix1 Table 4.

The international student load can be calculated as the difference between the total and domestic load, for each corresponding cell. It is evident that, the balance of load, following enrolments, is shifting towards international load. Total load increased by 3.6% from the previous year, largely due to the growth in international students in masters (coursework) degrees.

Assuming all the 2018 load is attributed to teaching engineering students, the 80,089 EFTS load is generated by the 119,433 enrolled students. Hence, on average, as for 2017, each engineering student represents approximately two-thirds of the engineering teaching load. The difference between this number and parity is due to part-time student enrolment and the contribution of teaching load from other academic areas into engineering programs. Most of the latter is 'service teaching' of mathematics, science and computing into the first two years of undergraduate engineering programs.

In Section 9.2, the load data are combined with staff data to estimate the overall student-staff ratio for engineering teaching and research training undertaken by the ACED members' faculties and schools.

5. COMMENCING ENROLMENTS

5.1 Commencements by award level

Future graduations are preceded by commencing enrolments. Appendix1, Table 5 provides the details of commencing student numbers by detailed award level. Figure 4 shows the trends for the broad award levels over the past decade.

Clearly, international commencement growth is underpinning the overall growth. In 2018 the majority (52.1%) of commencing enrolments were by international students, including those studying offshore.

Dominating this growth are international enrolments in coursework masters degrees, mostly in accredited entry-to-practice programs. The number of international commencing bachelor degree students dropped slightly.

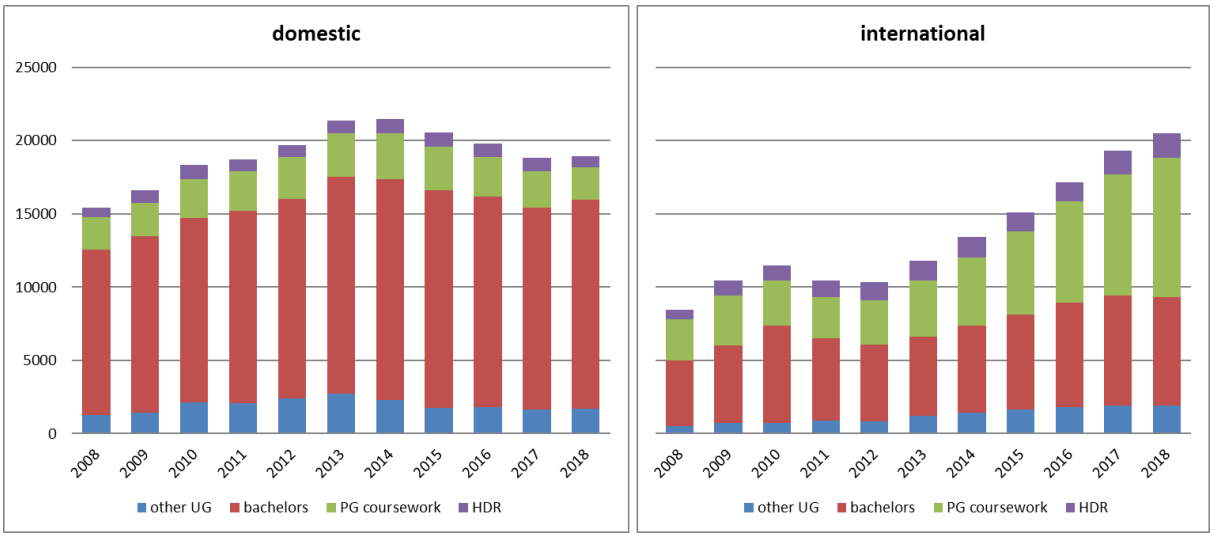


Figure 4 Domestic and international student commencing enrolments, 2008-18

Further comments on 2018 data and trends:

(i) *PhDs and master by research degrees (domestic: 717; international: 1,679)*

- Domestic PhD and research master commencements **dropped by 123 and 48** respectively, compared with 2017.
- International PhD commencements **increased by 63**, while the research master enrolment dropped by 16.
- Domestic research master commencements have halved since 2014, while international commencements have been variable, and less than 211 since 2013.

(ii) *Postgraduate coursework (domestic: 2,190; international: 9,484)*

- International commencements into coursework master degrees **grew by 15.6% from 2017**, following a 19.8% increase from 2016 (and doubling since 2014). These enrolments are into entry-to-practice degrees that are eligible for accreditation by Engineers Australia.
- In contrast, domestic commencements into coursework master degrees fell to 1,671, the lowest value since 2012. This indicates further decline in the take-up of advanced coursework master degrees aimed at practicing engineers. This interpretation is reinforced by the steady decline in commencements in graduate diplomas and graduate certificates, that has more than halved from 1,118 in 2014 to 519 in 2018.

(iii) *Bachelor degrees (domestic: 14,238; international: 7,447)*

- Annual total commencing enrolments into bachelor degrees have not changed much since 2014. However, d**omestic commencing enrolments increased by 3.6% in 2018, following three years of annual decreases.** This was part of a trend towards the STEM fields from Education, Society & Culture, and Creative Arts, as total domestic undergraduate commencing enrolments dropped by 9.4% (Appendix 1, Table 7).

- The slight **decrease in international** commencing enrolments is probably a result of increased local provision of bachelor degrees in countries from which Australia previously drew enrolments and that are now Washington Accord signatories, and preference by international graduates for the 2-year entry-to-practice coursework master degree pathway to a professional engineering qualification.

(iv) *Other undergraduate (domestic: 1,711; international: 1,894)*

- The total of commencing domestic enrolments in Associate Degrees and Advanced Diplomas by domestic students was 1,031 in 2018, similar to the 2017 figure, but much less than the 1,890 in 2013. The figure of 247 international commencements was very similar to that of 2017.
- Domestic and international commencing enrolments into Enabling and 'other' courses in 2018 were also very similar to those 2017, with international students being the larger cohort (1,647). These programs are intended to provide pathways into engineering degrees (see Section 5.3).

(v) *Participation of women commencing engineering awards in 2018*

- **Overall, the 2018 proportion of domestic women commencing any award program in engineering was the highest on record: 18.0%.** The 19.3% figure for international students was lower than the three previous years. The slow upward trends over the decade can be seen in Figure 5).

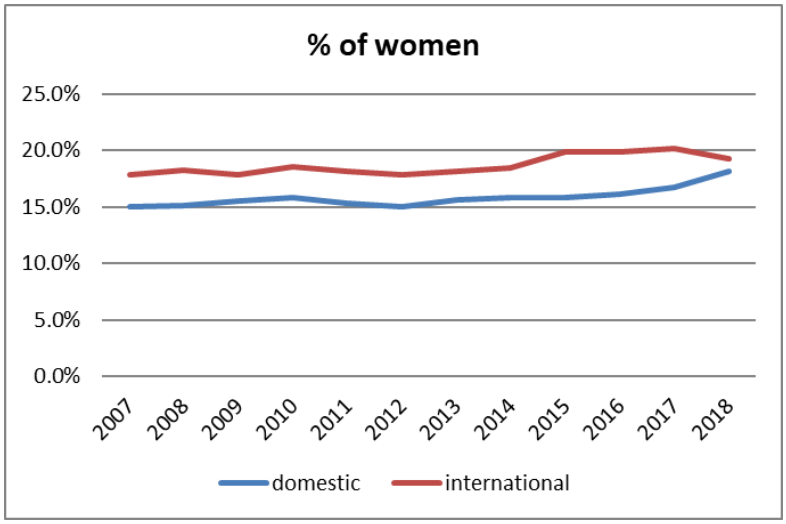


Figure 5 Proportions of women commencing award programs in engineering, 2007-18

- Research degrees in engineering have had **consistently higher rates of participation** by women than other categories of engineering qualification. In 2018, women were **27.5% and 29.2% of the domestic and international commencing PhD enrolments**, respectively. The corresponding figures for research master degrees were 24.3% and 16.5% (out of line with those of previous years).
- Domestic and international commencements by women **constituted 20.7% and 19.2%, respectively, of the 2018 coursework master degree cohorts**. The domestic figure is more than 1% higher than any previous year.
- The proportion of **women in the domestic bachelor degree cohort has increased from 15.1% to 18.7%** over the 2014 to 2018 period. The 2018 figure is the highest on record. The equivalent proportion in the international cohorts has varied between 18.4% and 21% over that period.
- Commencing enrolments by women into associate degrees and other undergraduate awards (with relatively small enrolments) continue to be at lower rates than those for bachelor degrees.

- These average figures conceal considerable variation by institution, reflecting its location, size, history and program mix. Appendix 1 Table 14 records the proportions of women in the commencing domestic and international cohorts for ACED members. For institutions with at least 100 commencing students in either cohort category, the female participation rates range from **9.7 % to 30.9% (domestic)** and **8.1% to 36.1% (international).**

5.2 Domestic commencements across all fields of education

Figure 6 (data in Appendix 1 Table 6) records the numbers of domestic students commencing HE awards in several fields of education, for all award levels. The grand total (409,594) in 2018 was the highest for any year on record.

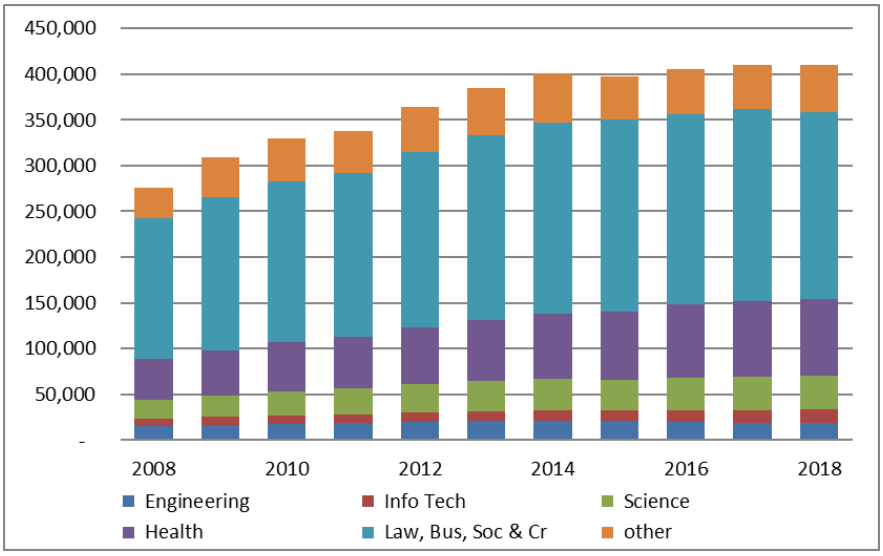


Figure 6 Domestic commencing enrolments (all awards) in selected fields, 2008-18

In 2018, and halting a three-year trend, the number and proportion of commencing domestic enrolments in Engineering & Related Technologies **remained at 4.6%** of the total commencing enrolments for all fields of education. This is the lowest figure on record, nevertheless.

The proportions of commencing domestic enrolments in Natural & Physical Sciences and Information Technology both increased slightly from their 2017 figures, to 9.0% and 3.5%, respectively.

The proportion of **domestic bachelor degree commencements in Engineering** amongst all fields of education **increased to 5.7% in 2018**, from its lowest value of 4.9% in 2017 (see Appendix 1 Table 7).

Interpreting the details of these data and trends in relation to the production of graduates qualified to enter professional engineering (via BEng(Hons) and entry-to-practice MEng programs) must take into account that Bachelor of Science commencements at the two universities that no longer enroll school leavers into undergraduate engineering will include students who will graduate with an accredited master degree.

5.3 Domestic students: basis of admission into bachelor degrees

Detailed data on commencing students' 'basis of admission' are provided in Appendix 1 Table 8.

In 2018, about 36.5% of commencing students were admitted to engineering bachelor degrees by a non-secondary school route. This is slightly lower than in 2017. The proportion admitted on the basis of a VET qualification (probably gained from the TAFE sector) has been fairly steady, at around 7.0% since 2004. The proportion admitted on the basis of secondary schooling (and their ATAR rank) decreased from more than 70% (in 2006) to less than 58% during 2014-16, but has increased since. The trends since 2012 can be seen in the following table:

basis of admission	domestic commencing students		
	2012	2016	2018
secondary school	65.0%	57.9%	63.4%
VET/TAFE	6.6%	7.3%	6.1%
higher education	19.2%	23.1%	21.0%
other	9.2%	11.7%	9.4%

The national '*Undergraduate Admissions, Offers and Acceptances'* report for 2018 includes tables showing the **shares of offers by ATAR band** for the applicant student cohorts for several fields of education. These shares are presented for Engineering and other fields in the following table:

field of education	< 50	50.05 – 60.00	60.05 – 70.00	70.05 – 80.00	80.05 – 90.00	> 90.05	Number of ATAR offers	% of ATAR offers
Natural & Physical Sciences	3.7%	5.7%	11.8%	16.9%	27.1%	34.8%	16,329	54.2%
Information Technology	9.9%	15.8%	20.7%	22.5%	19.7%	11.4%	3,709	42.7%
Engineering 2018	**2.0%**	**4.2%**	**8.2%**	**17.9%**	**27.1%**	**40.6%**	**9,921**	**58.4%**
Engineering 2017	2.0%	3.4%	8.5%	15.0%	30.1%	41.1%	9,619	57.8%
Health	6.3%	10.2%	16.0%	20.8%	22.5%	24.3%	21,257	32.7%
Management & Commerce	7.4%	10.9%	16.1%	18.6%	23.0%	24.0%	18,229	46.9%
All fields	6.9%	9.9%	15.5%	19.7%	23.4%	24.6%	11,6421	41.7%

As in 2017, of all fields (including those not reported in this table) Engineering had **the strongest 'ATAR profile'** (i.e. the field of education[7], with the highest proportions of offers to candidates with ATAR greater than 80.00 and 90.00, and the lowest proportion of those with ATAR less than 60.05). The Engineering field also has the **highest proportion of offers** made on the basis of ATAR.

The summary report on offers and admissions for 2019 reports that Engineering continues to be the field with the highest proportion of offers to students with ATAR greater than 90.00, but also that the number of applicants in Engineering dropped by 4.1%. The details will be included in next year's ACED report.

5.4 Countries of origin of onshore international students

As in previous years data has been obtained for the 'top sixteen' countries providing onshore international students. These are in Appendix 1 Table 9. The top eight countries contributed 80% of onshore international commencers.

As in previous years, China (excluding SARs and Taiwan) and India fill the top spots overall, accounting for nearly 62% of commencers. Notable is that India overtook China in the proportion of growth of postgraduate commencers, up to 3,384 (38.1%) in 2018 from 1,977 (24.5%) in the previous year. The number from China decreased from 3,582 to 3,094.

In terms of rank on overall commencements, Pakistan and Sri Lanka moved up one place to third and fourth, respectively, displacing Malaysia from 3rd to fifth. Vietnam retained 6th place and Nepal moved from 10th to 7th. Bangladesh was 8th in both 2018 and 2017.

[7] The sub-fields of Medical Studies, Dental Studies and Veterinary Studies within Health have stronger ATAR profiles, but much smaller enrolments than Engineering.

6. COMMENCEMENTS AND COMPLETIONS BY INDIGENOUS STUDENTS

The numbers of Indigenous students and graduates in Engineering & Related Technologies reported in the national statistics show that Indigenous students continue in small numbers. The following table shows the national figures for commencements and completions in broad award categories over 2013-18:

	P/G by Res'ch	P/G C'rsewk	Bachelor (inc Hons)	Other	Total		
	Persons	Persons	Persons	Persons	Male	Female	Persons
Commencements							
2013	< 5	10	110	21	128	16	144
2014	< 5	14	115	25	136	20	156
2015	< 5	12	108	23	124	21	145
2016	12		102	20	115	19	134
2017	21		143	18	146	36	182
2018	17		120	22	128	31	159
Completions							
2013	< 5	< 5	25	6	np	< 5	35
2014	0	8	37	7	45	7	52
2015	< 5	11	34	< 5	43	6	49
2016	7		38	10	51	4	55
2017	8		34	8	45	5	50
2018	6		52	<5	53	8	61

The commencing Indigenous student numbers in bachelor degrees in Engineering have not substantially grown over the past six years.

Indigenous students form less than 1% of the total domestic commencing cohort in Engineering, across all award levels. The comparable figure for Heath is 2.1%.

Completion numbers in Engineering indicate relatively high attrition, and completion rates of around 40%. The 2018 graduates from bachelor degrees would have commenced study during 2011-15.

Appendix 1 Table 10 breaks down the later year data by State and Territory. Queensland has consistently enrolled and graduated the largest numbers of Indigenous students, followed by New South Wales.

7. BACHELOR DEGREES: SUCCESS, RETENTION, AND GRADUATION RATES

The data appendices of previous editions of this report have included details on success and retention rates for Bachelors degree students in Engineering and Related Technologies. Data at this level of detail have not been collected this year, following the inclusion of visual analytics for Attrition, Retention and Success Rates on the Higher Education Statistics website.

7.1 Annual success rates

The success rate is defined as the aggregated proportion of courses (units of study) passed by a cohort of enrolled students in a given year. The following table includes the success rates for 2018 for domestic and international students enrolled in bachelor degrees, averaged over all years of study, following the more detailed previous year data.

Success rates	Domestic				International			
	male		female		male		female	
	full-time	part-time	full-time	part-time	full-time	part-time	full-time	part-time
For *commencing students*								
2001	82.1	63.7	86.6	65.4	83.6	70.4	88.5	77.2
2015	83.9	69.9	87.8	76.7	83.4	75.2	89.4	81.7
2016	84.4	68.3	87.1	71.2	83.8	80.4	90.5	77.7
2017	**84.2**	**68.0**	**87.9**	**71.7**	**83.4**	**76.5**	**89.8**	**78.8**
2018	**no data collected**				**no data collected**			
For *all students*								
2001	85.5	72.0	89.5	77.8	85.7	76.6	89.1	80.6
2015	87.2	75.1	90.4	78.7	86.2	76.9	91.2	82.9
2016	86.9	73.8	89.2	75.7	86.1	78.8	90.9	74.6
2017	**87.4**	**73.7**	**90.2**	**77.3**	**86.9**	**76.2**	**91.7**	**77.0**
2018	**85.5**				**84.2**			

It is evident that the average success rates do not change much from year to year, although they have increased since 2001. International students' average success rates have declined slightly from the 85.0% average figure in 2017 (not shown). The earlier year data revealed clearly that, on average, women perform better than men, part-time study has lower average success rates, and that success rates increase once beyond the first year of study.

The visual analytics data enable on-line inspection of the success rates of each provider and comparisons with rates for other fields of education. For domestic students, the **average success rate for Engineering is close to the 'All Fields average'** and ranks fifth after Health, Agriculture & Environment, Architecture & Building, and Creative Arts. Engineering ranks tenth of the 11 fields for international students.

For the university providers (ACED members) of bachelor degree programs in Engineering, the average success rate ranges from below 60% (two providers) to over 90% (8 providers). This range reflects the type of study (full-time/part-time) and educational background of the providers' cohorts as well as providers' location (regional/metropolitan) and history.

7.2 Annual retention and attrition rates

Retention rates record the progression outcome for the identified year as either **continuing** to the subsequent year of study, or **graduation** in the year of study or the following year, while attrition is the corresponding loss of students from their degree program[8]. Previous ACED reports included data

[8] The definitions for the attrition and retention rates may be found at https://heimshelp.education.gov.au/resources/glossary/glossaryterm?title=Attrition%20Rate and https://heimshelp.education.gov.au/resources/glossary/glossaryterm?title=Retention%20Rate

that revealed that the differences of annual retention rates with respect to students' citizenship status, gender and type of enrolment were similar to those of the success rates.

The visual analytics tool now reports only on retention for commencing students, (i.e. those in their first year of enrolment in a course of study), in two ways. The 'normal' rate applies to retention within an institution (using StudentID), while 'adjusted' rates allow for following year transfer to another HE provider, using the StudentID and CHESSN (national) identifiers. The following year enrolment may be in a different program or field of education. The Table below provides recent average retention rate data for bachelor degree students in Engineering and Related Technologies, compared with All Fields, and the 2005 baseline:

field of education	Domestic		International	
	Normal Rate, %	Adjusted Rate, %	Normal Rate, %	Adjusted Rate, %
2005				
Engineering	84.76	88.84	88.59	88.59
All fields	80.81	85.38	88.13	88.13
2016				
Engineering	85.62	90.48	92.37	92.37
All fields	79.38	85.12	90.41	90.41
2017				
Engineering	**86.21**	**91.12**	**92.84**	**92.84**
All fields	**78.84**	**84.77**	**90.98**	**90.98**

The 'adjusted retention rates' show that overall, domestic bachelor degree students in Engineering & Related Technologies enrolled over 2014 – 17 **had retention rates of about 90%.** This compares favourably with the rate of about 85% for all fields of education.

Comparison of the adjusted rate with the 'normal rate' implies that about 4 – 6% of domestic students in Engineering transfer between institutions after their first year of study. International students have slightly higher retention rates, but extremely low transfer rates. The average retention rates have increased slightly over the decade.

As for success rates, there are variations in adjusted retention rates between provider institutions; typically (for Engineering) **they are greater than 95%** at several metropolitan research universities, but around 70% for some regional institutions.

7.3 Completion rates

While the annual success and retention data record aspects of annual progression, of interest is Engineering students' enrolled time and their pathways to completion.

A visual analytics tool for 4, 6 and 9-year outcomes by commencement year, field of education and institution and other variables is now available. The following Table shows the aggregated data for domestic students commencing bachelor degrees in Engineering, from 2005. The final row of each set is obtained from 2018 graduation data working forward from commencing year data.

Year first enrolled	4 year outcomes, %				6 year outcomes, %				9 year outcomes, %			
	A	B	C	D	A	B	C	D	A	B	C	D
2008	25.7	58.6	10.2	5.5	62.0	18.7	14.5	4.9	74.5	5.1	16.0	4.5
2009	25.8	59.2	9.5	5.4	62.3	19.1	13.8	4.8	75.1	5.0	15.5	4.4
2010	25.0	59.6	9.8	5.6	63.1	18.4	13.5	4.8	75.1	5.4	14.9	4.6
2011	26.5	58.5	10.0	5.0	63.3	18.7	13.6	4.4				
2012	25.5	58.5	10.5	5.6	61.2	19.2	14.5	5.1				
2013	24.7	58.5	10.0	5.0	62.0	18.0	14.4	5.6				
2014	24.5	58.6	10.7	6.5								
2015	25.5	58.0	10.3	6.2								

Key A: award completed; B: still enrolled; C: re-enrolled but dropped out; D: never came back after first year

These average progression and completion patterns are clearly quite stable. They show that:

- after 4 years of study, about 25% of the students will have completed a degree;
- after 9 years of study, 75% will have completed, but 5% are still enrolled;
- about 5% will drop out of higher education after their first year
- about 20% will never complete, with a few percent leaving in their later years of enrolment.

These data are not the 'likelihood of completion' of the original degree in which they were enrolled, because the reported graduation may be in another field of education. These data include transfers between higher education institutions: more detailed data analysis has shown that up to about 9% of students may make such transfers.

The Department of Education does not routinely produce data that tracks cohorts of graduates back to their original enrolment. The 2018 ACED report used additional data to show that changing institutions is likely to increase the overall duration of study by about one year. These data also showed that only about 25% of the 2015 graduates in the national BEng(Hons) degree cohort would have completed in 'minimum time'. There is however, quite wide variation in this proportion between institutions, due to students' study mode (part-time/full-time), enrolment in dual degrees, temporary withdrawal of enrolments, etc.

The key take-home messages from completion data are that:

- more than 75% of students who **commence** a bachelor degree in Engineering & Related Technologies are likely to graduate within nine years;
- more than 75% of the graduates who **graduate** with a bachelor degree in Engineering & Related Technologies from the institution at which they commenced in higher education are likely to complete within six years.

These are important messages for external stakeholders, some of whom may believe that the standard engineering degree is of three year's duration (see Section 2), and that 'most' graduations are in minimum time.

8. GRADUATE OUTCOMES

National reporting on graduate outcomes and employment changed in 2016 with their inclusion in the Department of Education's Quality Indicators for Learning and Teaching (QILT) initiative. QILT surveys cover graduate satisfaction, graduate outcomes (employment rates and median salaries), and employer satisfaction, for graduates of postgraduate coursework and research programs, as well as those from undergraduate degrees.

Recent data for employment and remuneration for the Engineering & Related Technologies field of education, compared with others, are provided in Appendix 1 Table 11.

The 2019 Graduate Outcomes Survey report has less data than that of previous years, particularly for postgraduates. Engineering graduates from undergraduate programs are gaining full-time employment at higher rates than most other areas and receive higher median salaries. For those completing in 2016 to 2018 (surveyed in the following year):

Year/Field of Education	% in full-time employment	median salary		% in any employment	% in further FT study
		male	female		
2016 undergraduate Engineering	**79.4%**	**$ 63,500**	**$ 65,000**	**86.5%**	**14.2**
2016 undergraduates All fields	71.8%	$ 60,100	$ 59,000	86.5%	20.7
2017 undergraduate Engineering	**83.1%**	**$ 65,000**	**$ 65,000**	**88.2%**	**15.0**
2017 undergraduates All fields	72.9%	$ 63,000	$ 60,000	87.0%	19.4
2018 undergraduate Engineering	**84.8%**	**$ 67,800**	**$ 67,000**	**88.4%**	**12.8**
2018 undergraduates All fields	72.2%	$ 64,700	$ 61,500	87.7%	18.9

QILT also published the results of medium-term graduate outcomes (**Graduate Outcomes Survey – Longitudinal**) during 2019, comparing 2019 outcomes for the graduate cohorts surveyed in 2016. For some of the areas reported in more detail in Appendix 1 Table 12, these are:

Field of Education	% UGs in FT work, of those available		% Coursework PGs in FT work, of those available		% HDR graduates in FT work, of those available	
	2016	2019	2016	2019	2016	2019
Science & Mathematics	62.5	72.8	77.6	91.5	75.9	91.1
Computing and Information Systems	75.3	91.4	83.8	92.5	88.9	88.9
Engineering & Related Tech.	**78.4**	**95.4**	**84.0**	**93.7**	**77.6**	**93.2**
All Fields	**72.6**	**90.1**	**86.0**	**93.0**	**80.9**	**91.0**

Clearly full-time employment rates increase during the years after graduation for graduates of all levels, with Engineering having the highest rates amongst the STEM areas reported here.

The **2019 QILT Graduate Satisfaction Survey** of graduates from undergraduate engineering programs for STEM areas show similar patterns for 2018 as previous years. Data in Appendix 1 Table 12 (a) are:

Field of Education	% overall satisfaction (agreement)		% good teaching (agreement)		% generic skills (agreement)	
	2018	2019	2018	2019	2018	2019
Science & Mathematics	83.9	84.0	67.8	67.5	84.5	85.7
Computing and Information Systems	74.7	72.9	59.7	57.0	78.7	77.6
Engineering & Related Tech.	**74.8**	**74.4**	**49.7**	**49.4**	**82.9**	**83.8**
All Fields	**79.7**	**80.1**	**62.9**	**63.7**	**81.3**	**82.4**

Engineering is persistently the study area rated **worst in 'good teaching'**, behind Medicine. (but which improved 5 points in 2019). Engineering **performs well on the other satisfaction metrics, particularly generic skills**. ACED members will undoubtedly know their own institution's outcomes against these metrics.

The **2019 Employer Satisfaction Survey** headlined **Engineering** as the field of education **with the highest overall employer satisfaction (90%).** Relevant data are provided in Appendix 1, Table 12(b) and (c), including for other STEM fields and comparisons with the 2018 Survey.

The most interesting features of these findings are that employers rate engineering graduates well above those of all fields in foundation, collaborative, technical and employability skills, as well as overall satisfaction. Engineering graduates are marginally above the all field rate for adaptive skills.

Graduates' supervisors rate the **importance** of the graduates' qualification somewhat higher than the graduates themselves (this difference applies to all fields). However, the 67.7% of employers of Engineering graduates rating this measure as 'important or very important', is a lower figure than that for health graduates (79.2%), whose education is probably more specifically focused to employer needs.

The majority (92.2%) of graduates' supervisors across all fields of education rated the **extent** to which the qualification prepared graduates for their current role as 'well' or 'very well'. Again, Engineering graduates were rated higher than this (92.7%) but lower than Health (94.9%). Graduates themselves expressed about 5% points less confidence about the 'fit' of their qualification.

9. ACADEMIC STAFF DATA AND STUDENT-STAFF RATIOS FOR ACED MEMBERS

9.1 Academic staff numbers

From the DET sources, the total academic staff (full time equivalent) in non-casual positions in the University sector (ACED members) are provided in Appendix 1 Table 13, and Figure 7.

These data report that the number of FTE teaching staff (in Teaching-only and Teaching & Research positions) dropped by 180 in 2018 to 2,122, after peaking in 2016 at 2,395. The number of Research-only staff increased slightly to 1,682. Research-only staff made up 44.2% of the total. The number of Teaching-only positions increased to 173, FTE, the highest number on record.

These totals **understate** total engineering academic staffing, by the combination of several factors:

- several universities with engineering in a multi-field academic structure report zero staff;
- some universities attribute all of the academic staff in such structures against engineering;
- the contributions of casual staff teaching are not included: this may be particularly significant for considering the academic staffing for offshore provision of the programs.

Overall, it is estimated that in 2018 there were at least 2,500 FTE academic staff in teaching roles (including formal research supervision) amongst the ACED members.

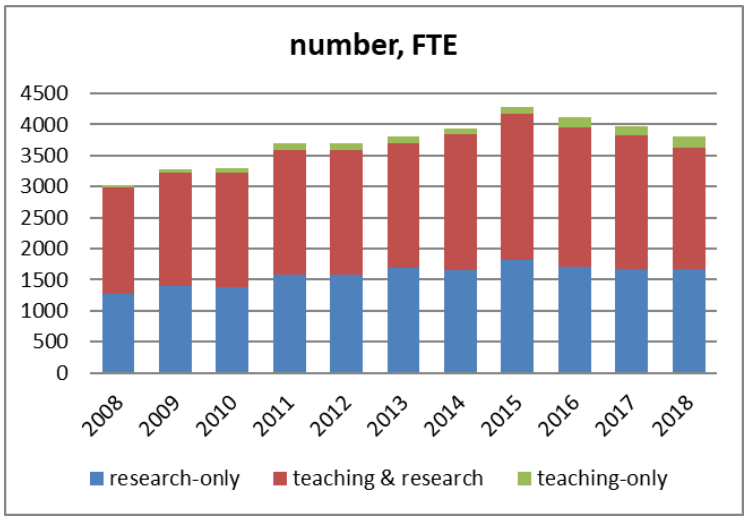


Figure 7 Academic staffing (FTE) in Engineering & Related Technologies, 2008-18

The number of FTE women in academic positions was almost the same as the 2017 figure, hence the proportion of women in academic positions has reached its highest figure ever, at 18.6%.

Figure 8(a) shows that the increase is primarily in Teaching & Research and Teaching-only positions, but this still lags the proportion in Research-only positions. Figure 8(b) shows that women are still lagging men in professorial level positions, and are mostly employed (both in number and proportion) in academic positions up to level B. Women academics take a third of the 'other' research positions: although this category is small (~100 FTE), this category needs further examination.

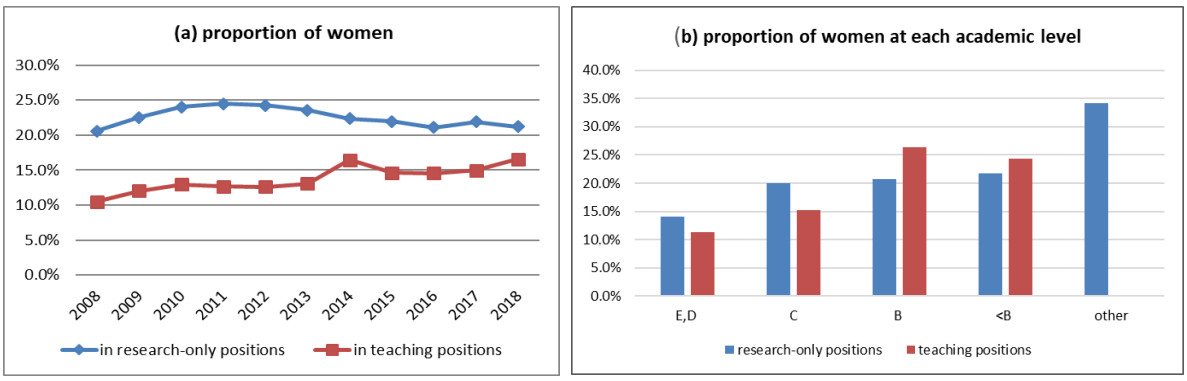


Figure 8 Female engineering academic staff (FTE) in Engineering & Related Technologies: (a) proportions by academic role 2008-18, (b) proportion at each academic level, 2018

9.2 Estimates of student-to-academic staff ratios

The *raw aggregate student load-to-teaching-academic-staff ratio* for the ACED members, calculated from the 2018 data is approximately 37. This is a significantly larger figure than in previous years, and is certainly an overestimate because of:

- net under-reporting of specific engineering staffing numbers by several institutions, as mentioned above;
- non-inclusion of casual teaching staff and contributions of research-only staff to teaching roles and research supervision;
- probable under-reporting of academic staffing for offshore delivery.

On the other hand, the available FTE staffing for teaching is effectively reduced by staff in Teaching & Research positions being allocated to full-time research or to management positions, and by academics on study leave.

10. ACED MEMBER PROFILES: ENROLMENTS AND PROGRAMS

Appendix 1 Table 14 provides summary data on the commencing and total enrolments and graduation and staffing from all the ACED members. From these data, it is clear that one institution, the University of New South Wales (including its College at Canberra which is a member of ACED in its own right) has the most enrolments and graduations.

In 2018, the sixteen Australian universities in the eleven member Group of Eight Engineering Deans and Associates (that includes Newcastle, Wollongong and Auckland), plus the six 'technology' universities (the ATN group plus QUT and Swinburne) had 72% of the domestic engineering commencing enrolments and 87% of domestic graduations, and 91% of international commencing enrolments and 83% of international graduations. The higher domestic graduation rate (compared with commencements) may reflect net transfers into these institutions; the lower international graduation rate (compared with commencements) reflects the time lag to graduation against a rapidly increasing number of commencements.

Appendix 1 Table 15 provides a tabulation of the coursework awards offered by each ACED member during 2019 in terms of the number of engineering branches covered by EA accredited awards (including entry-to-practice masters degrees) and the numbers of other postgraduate masters degrees in two categories: advanced technical awards in management. The latter are mostly 'engineering project management'. Appendix 1 Table 16 elaborates these data to show the branches of engineering in which the accredited programs are offered, both onshore and offshore. The sixteen institutions referred to above have the greatest number and spread of programs.

11. SOURCES and CAVEATS

The detailed enrolments, graduations, basis of admission and staffing data presented in the following Tables were purchased from the Department of Education Higher Education Statistics Unit.

Load data and less detailed data on enrolments and graduations are now available for download from the HE Statistics Unit website https://www.education.gov.au/higher-education-statistics or are compiled from the HE datacube (uCube) at https://www.education.gov.au/ucube-higher-education-data-cube

The HE Statistics Unit website provides links to visual analytics tools, including student success, retention and completion rates, as well as the annual *Undergraduate Applications, Offers and Admissions* reports.

The direct link to the QILT (Quality Indicators for Teaching and Learning) website is https://www.qilt.edu.au/about-this-site for access to annual Graduate Outcomes and Employer Satisfaction surveys.

As in previous years, the notes in Appendix 1 Table 2 and the comments on staff reporting raise questions about the completeness and accuracy of the data that ACED member universities are providing to the HE Statistics Unit. ACED members will know how to interpret their own data against these national summaries.

ACED takes responsibility for any errors in transcribing and interpreting data from these sources.

Prof Robin W King
Consultant to ACED
25 March 2020

APPENDIX 1 SUPPORTING TABLES

TABLE 1 ENGINEERING GRADUATIONS 2008-18

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
DOCTORATES	**697**	**705**	**792**	**782**	**953**	**1,113**	**1,268**	**1,259**	**1,358**	**1,417**	**1,437**
domestic total	513	479	474	399	496	536	572	603	603	637	641
% domestic female	24.2%	21.1%	22.0%	23.3%	23.2%	24.8%	27.3%	23.2%	27.0%	25.0%	28.7%
international total	184	226	318	383	457	577	696	656	755	780	796
% international female	17.4%	19.9%	19.9%	23.0%	25.2%	27.0%	24.3%	26.7%	23.0%	27.4%	22.9%
% international	26.4%	32.1%	40.2%	49.0%	48.0%	51.8%	54.9%	52.1%	55.6%	55.0%	55.4%
RESEARCH MASTER	**228**	**185**	**196**	**235**	**212**	**245**	**218**	**229**	**244**	**226**	**222**
domestic total	127	99	99	115	100	132	103	108	116	105	93
% domestic female	19.7%	18.2%	23.2%	26.1%	15.0%	22.0%	22.3%	31.5%	31.0%	21.9%	32.3%
international total	101	86	97	120	112	113	115	121	128	121	129
% international female	24.8%	25.6%	33.0%	22.5%	**31.3%**	26.5%	24.3%	41.3%	27.3%	23.1%	26.4%
% international	44.3%	46.5%	49.5%	51.1%	52.8%	46.1%	52.8%	52.8%	52.5%	53.5%	58.1%
COURSEWORK MASTER	**2,878**	**3,134**	**3,684**	**3,829**	**3,404**	**3,758**	**4,138**	**4,748**	**5,431**	**6,348**	**8,074**
domestic total	690	788	1,024	1,045	1,145	1,335	1,426	1,543	1,567	1,590	1,601
% domestic female	18.3%	17.6%	18.6%	16.1%	15.4%	17.9%	18.8%	19.4%	17.70%	17.6%	18.3%
international total	2,188	2,346	2,660	2,784	2,259	2,403	2,712	3,205	3,864	4,758	6,473
% international female	18.4%	18.8%	18.7%	18.9%	19.3%	19.5%	19.1%	19.5%	20.7%	22.4%	22.1%
% international	76.0%	74.9%	72.2%	72.7%	66.4%	64.3%	65.5%	67.5%	71.1%	75.0%	80.2%
OTHER POSTGRADUATE	**763**	829	**951**	**1,098**	**921**	**945**	**958**	**1,008**	**774**	**681**	**577**
domestic total	522	588	672	746	704	763	794	848	643	545	466
% domestic female	20.9%	19.0%	22.2%	17.8%	19.5%	17.6%	21.8%	18.4%	17.9%	16.9%	17.2%
international total	241	241	279	352	217	219	164	160	137	136	111
% international female	19.5%	17.0%	15.1%	13.6%	11.1%	16.0%	18.9%	21.3%	18.2%	19.3%	21.6%
% international	31.6%	29.1%	29.3%	32.1%	23.6%	22.3%	20.7%	18.9%	17.7%	25.0%	19.2%
BACHELOR	**8,661**	**8,652**	**9,149**	**9,849**	**10,261**	**11,018**	**11,373**	**11,117**	**11,561**	**12,043**	**12,987**
domestic total	6,077	6,063	6,237	6,534	6,795	7,044	7,392	7,634	7,743	7,742	8,295
% domestic female	14.7%	14.9%	14.7%	14.6%	14.9%	14.6%	15.3%	14.3%	14.60%	14.9%	15.3%
international total	2,584	2,589	2,912	3,315	3,466	3,974	3,981	3,483	3,818	4,301	4,692
% international female	21.2%	18.3%	18.4%	18.2%	18.1%	18.2%	19.9%	19.4%	19.6%	20.3%	22.2%
% international	29.8%	29.9%	31.8%	33.7%	33.8%	36.1%	35.0%	31.3%	33.0%	33.0%	36.1%
ASSOC DEG & ADV DIPL	**564**	**369**	**417**	**384**	**663**	**617**	**620**	**699**	**670**	**670**	**699**
domestic total	175	278	320	327	518	479	523	570	543	493	541
% domestic female	11.4%	8.6%	10.9%	~ 8%	~ 7%	8.1%	9.6%	9.5%	10.1%	7.3%	8.9%
international total	389	91	97	57	145	138	97	129	127	165	158
% international female	20.8%	4.4%	5.2%	~11%	~6%	8.0%	12.4%	12.4%	3.9%	13.9%	16.5%
% international	69.0%	24.7%	8.0%	14.8%	21.9%	22.4%	15.6%	18.5%	19.0%	19.0%	22.6%
OTHER UNDERGRAD	**76**	**314**	**404**	**534**	**501**	**551**	**1,035**	**1,029**	**1,350**	**1,350**	**1,364**
domestic total	60	60	109	130	141	152	264	239	285	291	278
% domestic female	15.0%	8.3%	4.6%	~ 8%	~ 7%	13.2%	7.6%	7.5%	7.4%	10.3%	8.6%
international total	16	254	295	404	360	399	771	790	1,065	1,099	1086
% international female	31.3%	13.8%	10.8%	~ 11%	~10%	8.0%	10.0%	14.1%	12.0%	13.9%	15.5%
% international	21.1%	80.9%	73.0%	75.7%	71.9%	72.4%	74.5%	76.8%	78.8%	81.4%	79.6%
ALL GRADUATES	**13,867**	**14,188**	**15,590**	**16,484**	**16,912**	**18,286**	**19,550**	**20,089**	**21,394**	**22,735**	**25,360**
domestic total	8,164	8,355	8,935	9,257	9,896	10,461	11,074	11,545	11,500	11,403	11,915
% domestic female	16.0%	15.6%	15.9%	15.2%	15.2%	15.5%	16.5%	15.5%	15.7%	15.6%	14.9%
international total	5,703	5,833	6,655	7,227	7,016	7,825	8,476	8,544	9,894	11,360	13,445
% international female	20.0%	18.2%	18.3%	18.0%	18.3%	18.6%	19.2%	19.7%	19.3%	20.9%	21.6%
% international	41.1%	41.1%	42.7%%	43.8%	41.5%	42.8%	43.4%	42.5%	46.2%	50.0%	53.0%

TABLE 2 BACHELOR DEGEE GRADUATIONS 2018, BY AWARD, DURATION AND 4-DIGIT FOE CODE

YEAR/SOURCE/LEVEL	TOTAL	0300	0301	0303	0305	0307	0309	0311	0313	0315	0317	0399
Domestic												
3-year Bach	578	13	0	6	7	17	0	25	23	282	33	172
4-year Bach	5363	1015	61	312	15	657	1117	156	703	198	56	1073
> 4-year Bach	2355	738	8	246	2	241	284	3	223	90	2	518
TOTAL DOMESTIC	**8296**	**1766**	**69**	**564**	**24**	**915**	**1401**	**184**	**949**	**570**	**91**	**1763**
% female	15.3%	13.1%	4.3%	29.4%	0.0%	10.3%	15.3%	6.5%	9.0%	16.3%	2.2%	20.6%
~ % of total (ex 300/399)			1.4%	11.8%	0.5%	19.2%	29.4%	3.9%	19.9%	12.0%	1.9%	
International												
3-year Bach	434	36	36	4	8	16	0	3	24	227	43	37
4-year Bach	4059	1018	6	253	14	538	660	6	612	70	69	813
> 4-year Bach	201	94	0	15	0	7	19	0	10	4	3	49
TOTAL INTERNATIONAL	**4694**	**1148**	**42**	**272**	**22**	**561**	**679**	**9**	**646**	**301**	**115**	**899**
% female	22.2%	26.1%	59.9%	39.3%	0.0%	10.2%	21.9%	22.2%	12.2%	27.9%	7.8%	25.4%
~ % of total (ex 300/399)			4.9%	20.9%	0.0%	11.1%	29.1%	0.4%	15.4%	16.4%	1.8%	
% international	36.1%	39.4%	37.8%	32.5%	47.8%	38.0%	32.6%	4.7%	40.5%	34.6%	55.8%	33.8%

ASCED 4-digit codes

0300 Engineering & Related Technologies
0301 Manufacturing Eng. & Tech.
0303 Process & Resources Engineering
0305 Automotive Eng. & Tech.
0307 Mechanical & Industrial Eng & Tech.
0309 Civil Engineering
0311 Geomatic Eng. & Tech
0313 Electrical & Electronic Eng. & Tech,
0315 Aerospace Eng. & Tech.
0317 Maritime Eng. & Tech
0399 Other Engineering & Related Tech's

6-digit ASCED codes are shown in Table 20

Notes:

Low numbers (<5) are suppressed in individual providers' returns to avoid identification of individuals. In the aggregates some of these are resolved by subtraction or are estimated.

ANU, Curtin, CQUni, JCU, Murdoch UTS, UWA, WSU use code 0300 for most Bachelor degree graduates.

CDU, Griffith, Monash, QUT and USQ and use code 0399 for most Bachelor degree graduates

"Software engineering" does not appear specifically in the ASCED codes for either engineering or Information Technology (ASCED FOE code 02), so may be classified in the universities' returns in different ways. See Table 19.

The 0301 manufacturing engineering sub-code includes "printing", "textile/garment/furniture making", that are likely to be more relevant to sub degree-level HE qualifications offered by the VET sector.

0315 Aerospace Eng. and Technology includes 3-year civil aviation degrees, taken primarily by students aiming towards the aviation industry. Many of these programs offer commercial pilot training in parallel with the academic award.

The full set of ASCED codes is at:
http://www.abs.gov.au/Ausstats/abs@.nsf/0/E7779A9FD5C8D846CA256AAF001FCA5C?opendocument

TABLE 3 TOTAL ENROLMENTS (STUDENTS) 2008-18

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
DOCTORATES	**4,559**	**5,054**	**5,567**	**6,258**	**7,059**	**7,427**	**7,668**	**8,035**	**8,338**	**8,718**	**8,971**
domestic total	2,852	2,866	2,982	3,183	3,404	3,389	3,372	3,617	3,788	3,877	3,664
% domestic female	22.4%	22.9%	23.8%	23.9%	23.7%	24.9%	25.5%	25.5%	26.1%	26.3%	26.2%
international total	1,707	2,188	2,585	3,075	3,655	4,038	4,296	4,418	4,550	4,841	5,307
% international female	24.8%	26.0%	26.4%	27.1%	26.6%	25.7%	25.9%	25.9%	26.0%	26.8%	27.5%
% international	37.4%	43.3%	46.4%	49.1%	51.8%	54.4%	56.0%	55.0%	54.6%	55.5%	59.2%
RESEARCH MASTER	**1,018**	**1,120**	**1,245**	**1,191**	**1,194**	**1,148**	**1,191**	**1,182**	**1,070**	**1,017**	**933**
domestic total	598	697	769	704	689	662	684	712	660	590	493
% domestic female	20.9%	19.5%	20.0%	19.9%	20.6%	22.4%	21.8%	21.5%	21.4%	21.5%	18.2%
international total	420	423	476	487	505	486	507	470	410	427	440
% international female	26.4%	29.8%	28.6%	27.9%	29.9%	29.8%	27.6%	26.6%	28.8%	26.7%	22.5%
% international	41.3%	37.8%	38.2%	40.9%	42.3%	42.3%	42.6%	39.8%	38.3%	42.0%	47.2%
COURSEWORK MASTER	**7,706**	**8,630**	**9,266**	**8,999**	**9,078**	**10,566**	**12,776**	**15,237**	**18,381**	**21,605**	**24,663**
domestic total	2,764	3,164	3,630	3,856	4,061	4,434	4,822	5,159	5,358	5,342	5,014
% domestic female	18.3%	17.0%	17.3%	16.9%	16.9%	17.7%	18.6%	18.8%	17.9%	17.8%	19.2%
international total	4,942	5,466	5,636	5,143	5,017	6,132	7,954	10,078	13,023	16,263	19,649
% international female	17.5%	17.1%	18.1%	18.4%	18.5%	17.6%	17.7%	18.9%	20.2%	20.4%	19.4%
% international	64.1%	63.3%	60.8%	57.2%	55.3%	58.0%	62.3%	66.1%	70.9%	75.3%	79.7%
OTHER POSTGRADUATE	**2,486**	**2,556**	**2,611**	**2,555**	**2,554**	**2,525**	**2,286**	**1,924**	**1,533**	**1,390**	**1,221**
domestic total	2,085	2,085	2,151	2,122	2,206	2,177	2,051	1,698	1,328	1,175	1,059
% domestic female	19.1%	19.0%	19.6%	20.0%	18.8%	19.4%	17.8%	17.4%	17.1%	18.6%	18.2%
international total	401	471	460	433	348	348	235	226	205	215	162
% international female	15.7%	13.8%	16.1%	17.1%	17.2%	19.5%	20.0%	21.2%	21.5%	17.2%	23.4%
% international	16.1%	18.4%	17.6%	16.9%	13.6%	13.8%	10.3%	11.7%	13.4%	15.5%	13.3%
BACHELOR	**54,556**	**57,842**	**61,518**	**64,236**	**66,207**	**69,342**	**71,560**	**73,138**	**74,874**	**75,767**	**77,365**
domestic total	40,693	42,726	44,656	46,385	48,083	50,547	52,135	52,755	52,722	51,885	52,254
% domestic female	13.7%	13.7%	14.0%	13.8%	13.4%	13.7%	14.1%	14.4%	14.9%	15.5%	16.4%
international total	13,863	15,116	16,862	17,851	18,124	18,795	19,425	20,383	22,152	23,882	25,111
% international female	17.7%	17.5%	17.6%	17.5%	17.4%	17.7%	18.1%	19.0%	19.3%	20.0%	19.9%
% international	25.4%	26.1%	27.4%	27.8%	27.4%	27.1%	27.1%	27.9%	29.6%	31.5%	32.5%
ASSOC DEG & AQF DIPL	**1,911**	**2,419**	**3,050**	**3,408**	**4,318**	**4,199**	**3,746**	**3,654**	**3,400**	**3,233**	**3,218**
domestic total	1,681	2,095	2,740	2,980	3,818	3,752	3,401	3,240	2,937	2,719	2,715
% domestic female	10.7%	9.5%	10.3%	n/a	9.0%	9.5%	9.1%	9.5%	9.4%	9.5%	10.0%
international total	230	324	310	428	500	447	345	414	463	514	503
% international female	3.0%	4.0%	3.2%	n/a	24.6%	11.9%	9.0%	6.8%	8.0%	10.3%	12.1%
% international	12.0%	13.4%	10.2%	12.6%	11.6%	10.6%	9.2%	11.3%	13.6%	15.9%	15.6%
OTHER UNDERGRADUATE	**1,214**	**1,470**	**2,082**	**1,540**	**1,649**	**2,609**	**3,077**	**3,040**	**3,463**	**3,500**	**3,529**
domestic total	509	671	971	576	596	1,175	1,206	847	918	869	876
% domestic female	27.7%	26.8%	28.1%	n/a	40.4%	24.0%	18.3%	14.5%	17.0%	8.9%	10.0%
international total	705	799	1,111	1,101	1,053	1,434	1,871	2,193	2,545	2,631	2,653
% international female	17.6%	12.6%	11.9%	n/a	n/a	8.5%	9.2%	10.2%	11.3%	13.0%	13.4%
% international	58.1%	54.4%	53.4%	71.5%	63.9%	55.0%	60.8%	72.1%	73.5%	75.2%	75.2%
ALL ENROLMENTS	**73,450**	**79,091**	**85,339**	**88,777**	**92,059**	**97,816**	**102,304**	**106,210**	**111,059**	**115,420**	**119,433**
domestic total	51,182	54,304	57,899	60,251	62,857	66,136	67,671	68,028	67,711	66,647	66,075
% domestic female	14.8%	14.7%	15.0%	14.8%	14.5%	14.8%	15.0%	14.9%	15.6%	16.0%	16.9%
international total	22,268	24,787	27,440	28,526	29,202	31,680	34,633	38,182	43,348	48,773	53,358
% international female	18.1%	18.0%	18.3%	18.7%	18.4%	18.4%	18.6%	16.9%	19.8%	14.9%	20.2%
% international	30.3%	31.3%	32.2%	32.1%	31.7%	32.4%	33.9%	35.9%	39.0%	42.3%	44.7%

TABLE 4 STUDENT LOAD (EFT) IN ENGINEERING AND RELATED TECHNOLOGIES, 2018

DOMESTIC STUDENT LOAD (2018)	Doctor-ates	Master	other p-grad	Bach-elor	other u-grad	Enab	Non award	TOTAL
Manufacturing Engineering & Technology	20	64	3	763	35	0	0	**885**
Process and Resources Engineering	497	283	79	2,445	89	0	3	**3,396**
Automotive Engineering & Technology	1	0	0	33	0	0	0	**34**
Mech/Industrial Eng & Technology	415	357	53	5,991	231	0	4	**7,050**
Civil Engineering	470	660	59	7,249	237	0	6	**8,681**
Geomatic Engineering	37	98	35	1,162	105	1	2	**1,439**
Electrical/Electronic Eng & Technology	557	567	23	7,421	255	0	10	**8,832**
Aerospace Engineering & Technology	59	68	115	1,176	123	0	4	**1,545**
Maritime Engineering & Technology	27	16	7	187	1	0	0	**237**
Other Engineering & Related Tech's	431	775	83	7,118	314	2	16	**8,740**
DOMESTIC TOTAL 2018	**2,514**	**2,888**	**457**	**33,545**	**1,390**	**3**	**45**	**40,839**
DOMESTIC TOTAL 2017	2,721	3,164	469	33,730	1,437	5	61	**41,587**
DOMESTIC TOTAL 2016	2,695	3,249	546	34,783	1,455	7	51	**42,787**
DOMESTIC TOTAL 2015	2,588	3,114	629	35,134	1,521	46	58	**43,087**
DOMESTIC TOTAL 2014	2,378	2,730	746	34,681	1,609	55	69	**42,267**
DOMESTIC TOTAL 2013	2,225	2,399	756	33,571	1,608	62	49	**40,856**
DOMESTIC TOTAL 2012	2,304	2,080	766	31,962	1,563	65	33	**38,890**
DOMESTIC TOTAL 2011	2,273	1,918	673	30,118	1,376	62	25	**36,630**

ALL STUDENT LOAD (2017)	Doctor-ates	Masters	other p-grad	Bach-elor	other u-grad	Enab	Non award	TOTAL
Manufacturing Engineering & Technology	44	1,014	4	1,062	64	0	15	**2,202**
Process and Resources Engineering	1,485	1,312	94	4,674	166	0	29	**7,759**
Automotive Engineering & Technology	1	34	0	57	0	0	1	**93**
Mech/Industrial Eng & Technology	1,000	2,218	63	9,616	400	0	59	**13,356**
Civil Engineering	1,376	3,532	72	11,729	381	0	53	**17,143**
Geomatic Engineering	92	352	41	1,331	121	1	8	**1,947**
Electrical/Electronic Eng & Technology	1,487	4,490	50	11,512	434	0	97	**18,070**
Aerospace Engineering & Technology	98	146	117	1,754	175	0	7	**2,298**
Maritime Engineering & Technology	49	59	9	317	28	0	0	**462**
Other Engineering & Related Tech's	1,154	4,656	113	10,003	743	2	89	**16,759**
TOTAL (ALL STUDENTs) 2018	**6,786**	**17,813**	**563**	**52,055**	**2,512**	**3**	**358**	**80,089**
TOTAL (ALL STUDENTS) 2017	6,661	15,714	594	51,272	2,659	5	378	77,284
TOTAL (ALL STUDENTS) 2016	6,440	13,264	662	50,828	2,600	7	723	**74,525**
TOTAL (ALL STUDENTS) 2015	6,207	10,931	749	49,765	2,529	46	975	**71,201**
TOTAL (ALL STUDENTS) 2014	5,904	9,025	876	48,503	2,511	55	1,058	**67,931**
TOTAL (ALL STUDENTS) 2013	5,640	7,192	914	47,220	2,408	62	395	**63,999**
TOTAL (ALL STUDENTS) 2012	5,215	5,913	1,033	44,935	2,275	65	141	**59,802**
TOTAL (ALL STUDENTS) 2011	4,789	5,650	982	42,911	2,089	62	130	**56,816**

TABLE 5 ENGINEERING COMMENCEMENTS (STUDENTS) 2008-18

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
DOCTORATES	**1,039**	**1,390**	**1,476**	**1,528**	**1,629**	**1,789**	**1,834**	**1,870**	**1,833**	**2,140**	**2,080**
domestic number	498	586	678	621	601	662	673	718	701	712	589
% domestic female	23.7%	24.4%	24.2%	22.7%	27.6%	25.1%	27.2%	25.2%	24.5%	25.4%	27.5%
international number	541	804	798	907	1,028	1,127	1,161	1,152	1,132	1,428	1,491
% international female	27.5%	28.0%	24.8%	27.9%	24.8%	26.4%	28.3%	24.7%	27.7%	27.5%	29.2%
% international	52.1%	57.8%	54.1%	59.4%	63.1%	63.0%	63.3%	61.6%	61.8%	66.7%	71.7%
RESEARCH MASTERS	**320**	**506**	**521**	**451**	**456**	**433**	**469**	**416**	**375**	**380**	**316**
domestic number	187	298	303	219	231	234	258	253	214	176	128
% domestic female	23.5%	17.1%	19.5%	21.9%	24.7%	23.5%	19.4%	19.4%	24.3%	24.4%	24.3%
international number	133	208	218	232	225	199	211	163	161	204	188
% international female	27.2%	30.8%	24.8%	28.9%	28.9%	27.6%	26.1%	26.4%	31.1%	26.0%	16.5%
% international	41.6%	41.1%	41.8%	51.4%	49.3%	46.0%	45.0%	39.2%	42.9%	53.7%	59.5%
COURSEWORK MASTER	**3,680**	**4,549**	**4,311**	**3,997**	**4,448**	**5,372**	**6,560**	**7,564**	**8,787**	**10,032**	**11,035**
domestic number	1,128	1,449	1,541	1,562	1,690	1,780	2,043	2,091	2,023	1,931	1,671
% domestic female	18.8%	16.4%	16.7%	17.6%	15.8%	18.7%	19.2%	18.7%	17.5%	17.3%	20.7%
international number	2,552	3,100	2,770	2,435	2,758	3,592	4,517	5,473	6,764	8,101	9,364
% international female	18.3%	16.8%	20.0%	19.4%	18.7%	17.4%	18.6%	20.3%	20.9%	20.2%	19.2%
% international	69.3%	68.1%	64.3%	60.9%	62.0%	66.9%	68.9%	72.4%	77.0%	80.8%	84.9%
OTHER POSTGRADUATE	**1,331**	**1,103**	**1,447**	**1,511**	**1,448**	**1,416**	**1,247**	**1,021**	**835**	**772**	**639**
domestic number	1,080	787	1,132	1,101	1,186	1,167	1,118	844	682	594	519
% domestic female	20.0%	17.7%	19.8%	21.4%	18.7%	19.6%	16.5%	18.4%	17.3%	19.4%	18.1%
international number	251	316	315	410	262	249	129	177	153	178	120
% international female	17.7%	13.4%	19.4%	13.2%	16.4%	19.3%	16.3%	21.5%	24.8%	19.1%	24.2%
% international	18.9%	28.6%	21.8%	27.1%	18.1%	17.6%	10.3%	17.3%	18.3%	23.1%	18.8%
BACHELOR	**15,760**	**17,363**	**19,167**	**18,741**	**18,818**	**20,234**	**21,048**	**21,406**	**21,484**	**21,218**	**21,685**
domestic number	11,295	12,052	12,541	13,152	13,595	14,817	15,085	14,896	14,390	13,736	14,238
% domestic female	14.1%	14.5%	14.4%	13.9%	13.7%	14.4%	15.1%	15.2%	15.7%	16.9%	18.1%
international number	4,465	5,311	6,626	5,589	5,186	5,417	5,963	6,510	7,094	7482	7,447
% international female	17.6%	17.4%	15.1%	11.9%	17.1%	18.3%	18.4%	21.0%	19.1%	20.3%	18.7%
% international	28.3%	30.6%	34.6%	29.8%	27.8%	26.8%	28.3%	30.4%	33.0%	35.3%	34.3%
ASSOC DEG & ADV DIP	**975**	**1,111**	**1,514**	**1,532**	**1,959**	**2,094**	**1,562**	**1,374**	**1,372**	**1,275**	**1,342**
domestic number	842	930	1,357	1,257	1,659	1,890	1,370	1,178	1,136	1,031	1,095
% domestic female	9.9%	8.7%	10.0%	8.2%	7.8%	9.3%	8.3%	10.8%	10.1%	10.8%	10.9%
international number	133	181	157	275	300	204	192	196	236	244	247
% international female	3.0%	5.2%	na	7.2%	8.3%	18.6%	4.7%	6.1%	12.7%	10.7%	14.2%
% international	13.6%	16.3%	10.4%	18.0%	15.3%	54.6%	12.3%	14.3%	17.2%	19.1%	18.4%
ENABLING & OTHER	**786**	**1,056**	**859**	**1,434**	**1,307**	**1,841**	**2,144**	**1,988**	**2,249**	**2,304**	**2,263**
domestic number	410	521	798	811	748	836	909	564	655	631	616
% domestic female	26.8%	28.6%	24.4%	45.3%	32.8%	28.1%	19.4%	14.5%	20.0%	n/a	10.6%
international number	376	535	61	623	559	1,005	1,235	1,424	1,594	1,673	1,647
% international female	13.8%	14.0%	12.7%	1.8%	8.8%	8.2%	9.7%	10.5%	12.7%	13.8%	12.6%
% international	47.8%	50.7%	37.6%	43.4%	42.8%	0.0%	57.6%	71.6%	70.9%	72.6%	72.8%
ALL COMMENCEMENTS	**23,591**	**27,508**	**28,975**	**29,199**	**30,065**	**33,179**	**34,864**	**35,639**	**36,935**	**38,121**	**39,360**
domestic number	15,030	16,994	18,352	18,813	19,710	21,386	21,456	20,544	19,801	18,811	18,856
% domestic female	15.1%	15.5%	15.8%	15.3%	15.0%	15.6%	15.8%	15.8%	16.1%	16.7%	18.0%
international number	8,561	10,514	10,623	10,386	10,355	11,793	13,408	15,095	17,134	19,310	20,504
% international female	18.3%	17.8%	18.5%	18.1%	17.8%	18.1%	18.4%	19.9%	19.9%	20.2%	19.3%
% international	36.3%	38.2%	36.7%	35.6%	34.4%	35.5%	38.5%	42.4%	46.4%	50.7%	52.1%

TABLE 6 PROPORTION OF ALL DOMESTIC COMMENCMENTS (TO ALL AWARD LEVELS), ENGINEERING & RELATED TECHNOLOGIES AND OTHER AREAS 2008-18

year	Engineering & Related Technologies	% of total	Health	Natural & Physical Science	Information Technology	Law, Business, Society, Creative Arts (composite FoE's)	total commencing award programs
2008	15,440	5.6%	44,812	20,811	7,470	153,908	276,200
2009	16,994	5.5%	49,217	23,633	8,328	167,817	308,821
2010	18,172	5.5%	54,097	26,619	8,704	175,649	329,248
2011	18,813	5.6%	56,628	28,169	9,263	179,222	338,188
2012	19,710	5.4%	61,864	31,847	10,060	190,917	364,197
2013	21,433	5.6%	66,827	33,163	10,292	201,234	384,251
2014	21,456	5.3%	71,419	34,064	11,187	209,246	401,356
2015	20,544	5.2%	75,170	33,639	11,488	209,164	397,296
2016	19,902	4.9%	80,364	35,682	12,347	208,351	405,085
2017	18,816	4.6%	82,657	36,235	14,223	210,302	410,167
2018	18,941	4.6%	82,995	36,828	14,902	204,902	409,594

TABLE 7 UNDERGRADUATE DOMESTIC COMMENCEMENTS, ALL FIELDS OF EDUCATION, 2009-18

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Natural & Physical Sciences	19,919	22,820	24,486	27,892	29,017	29,890	29,175	31,127	31,666	31,848
Information Technology	6,264	6,713	7,361	7,942	8,048	9,098	9,504	9,922	11,529	11,933
Engineering & Rel'd Technologies	**13,200**	**14,186**	**14,706**	**15,489**	**17,123**	**16,949**	**16,545**	**16,027**	**15,382**	**15,990**
Architecture & Building	5,357	5,746	6,116	6,256	6,232	6,054	6,662	7,059	7,611	8,165
Agriculture, Envir'l &Related Studies	3,834	3,946	3,916	3,900	4,073	3,840	3,536	3,652	3,404	3,700
Health	33,947	37,321	38,458	42,224	47,412	50,509	54,166	58,969	60,317	60,276
Education	21,402	22,473	22,572	25,322	25,765	27,076	26,139	24,761	24,817	22,605
Management & Commerce	38,233	38,229	39,650	43,569	45,447	49,695	48,398	47,890	48,432	47,928
Society & Culture	56,255	61,914	62,524	67,458	71,042	71,925	75,422	74,951	78,332	75,798
Creative Arts	22,112	23,100	24,076	25,679	27,504	27,054	27,481	28,351	28,738	27,081
Food. Hospitality & Personal Services	62	59	64	47	33	21	16	17	148	96
TOTAL	**220,585**	**236,507**	**243,929**	**265,778**	**281,696**	**292,111**	**297,044**	**302,726**	**312,393**	**282,914**
Engineering, proportion of all fields, %	6.0%	6.0%	6.0%	5.8%	6.1%	5.8%	5.6%	5.3%	4.9%	5.7%

TABLE 8 BASIS OF ADMISSION INTO BACHELORS DEGREES IN ENGINEERING & RELATED TECHNOLOGIES, 2008 – 18

	DOMESTIC STUDENTS					INTERNATIONAL STUDENTS				
	Total	Higher Ed complete/in-complete Aus or O/S	TAFE/VET award complete or incomplete	Completion of final year of secondary at school or TAFE (Aus or O/S)	Other	Total	Higher Ed complete/in-complete Aus or O/S	TAFE/VET award complete or incomplete	Completion of final year of secondary at school or TAFE (Aus or O/S)	Other
2008	11,295	1,723	691	7,313	1,568	4,465	1,495	251	1,393	1,326
2009	12,052	1,851	727	8,125	1,349	5,311	1,461	389	1,706	1,755
2010	**no data collected**									
2011	13,154	2,435	978	8,542	1,181	5,589	1,556	359	1,597	2,077
2012	13,595	2,604	904	8,835	1,252	5,223	1,392	388	1,366	2,077
2013	14,817	2,989	1,184	9,119	1,525	5,417	1,310	438	1,694	1,975
2014	15,085	3,665	1,013	8,791	1,534	5,963	2,005	312	1,666	1,980
2015	14,896	3,357	964	8,686	1,889	6,510	2,085	361	1,894	2,170
2016	14,390	3,323	1,046	8,332	1,689	7,094	2,462	451	2,063	2,118
2017	13,736	2,978	897	8,461	1,400	7,480	2,695	581	2,200	2,004
2018	14,228	2,989	872	9,027	1,340	not available				
	AS PERCENTAGES					**AS PERCENTAGES**				
2008	11,295	15.3%	6.1%	64.7%	13.9%	4,465	33.5%	5.6%	31.2%	29.7%
2009	12,052	15.4%	6.0%	67.4%	11.2%	5,311	27.5%	7.3%	32.1%	33.0%
2010	**no data collected**									
2011	13,154	18.5%	7.4%	64.9%	9.0%	5,589	27.8%	6.4%	28.6%	37.2%
2012	13,595	19.2%	6.6%	65.0%	9.2%	5,223	26.7%	7.4%	26.2%	39.8%
2013	14,817	20.2%	8.0%	61.5%	10.3%	5,417	24.2%	8.1%	31.3%	36.5%
2014	15,085	24.3%	6.7%	58.3%	10.2%	5,963	33.6%	5.2%	27.9%	33.2%
2015	14,896	22.5%	6.5%	58.3%	12.7%	6,510	32.0%	5.5%	29.1%	33.3%
2016	14,390	23.1%	7.3%	57.9%	11.7%	7,094	34.7%	6.4%	29.1%	29.9%
2017	13,736	21.7%	6.5%	61.6%	10.2%	7,480	36.0%	7.8%	29.4%	26.8%
2018	14,228	21.0%	6.1%	63.4%	9.4%	not available				

'Other' covers admission on the basis of 'mature age special provisions', 'professional qualifications', and 'other'

TABLE 9 TOP 16 COUNTRIES OF ORIGIN: ONSHORE COMMENCERS IN ENGINEERING & RELATED TECHNOLOGIES, 2017-18

	P/G Research and Coursework	Bachelors (inc Hons)	Other	Total	P/G Research and Coursework	Bachelors (inc Hons)	Other	Total	overall rank
2018									
China (excludes SARs and Taiwan Province)	3,094	1,805	596	5,495	34.8%	36.8%	37.4%	**35.7%**	**1**
India	3,384	506	117	4,007	38.1%	10.3%	7.3%	**26.1%**	**2**
Pakistan	422	218	148	788	4.8%	4.4%	9.3%	**5.1%**	**3**
Sri Lanka	136	277	64	477	1.5%	5.7%	4.0%	**3.1%**	**4**
Malaysia	73	323	35	431	0.8%	6.6%	2.2%	**2.8%**	**5**
Viet Nam	94	252	84	430	1.1%	5.1%	5.3%	**2.8%**	**6**
Nepal	243	124	27	394	2.7%	2.5%	1.7%	**2.6%**	**7**
Bangladesh	152	126	52	330	1.7%	2.6%	3.3%	**2.1%**	**8**
Indonesia	99	101	105	305	1.1%	2.1%	6.6%	**2.0%**	**9**
Hong Kong (SAR of China)	27	160	42	229	0.3%	3.3%	2.6%	**1.5%**	**10**
Saudi Arabia	97	95	20	212	1.1%	1.9%	1.3%	**1.4%**	**11**
Iran	172	23	5	200	1.9%	0.5%	0.3%	**1.3%**	**12**
Singapore	14	108	21	143	0.2%	2.2%	1.3%	**0.9%**	**13**
Thailand	39	43	5	87	0.4%	0.9%	0.3%	**0.6%**	**14**
Kuwait	7	53	12	72	0.1%	1.1%	0.8%	**0.5%**	**15**
Iraq	13	12	0	25	0.1%	0.2%	0.0%	**0.2%**	**16**
All other Countries	817	673	261	1751	9.2%	13.7%	16.4%	**11.4%**	
Total on-shore	**8,883**	**4,899**	**1,594**	**15,376**					
Total international (Table 5)	**11,163**	**7,447**	**1,894**	**20,504**					
2017									
China (excludes SARs and Taiwan Province)	3,582	1,992	667	**6,241**	44.4%	39.3%	38.2%	**42.0%**	**1**
India	1,977	371	89	**2,437**	24.5%	7.3%	5.1%	**16.4%**	**2**
Malaysia	94	528	68	**690**	1.2%	10.4%	3.9%	**4.6%**	**3**
Pakistan	384	159	90	**633**	4.8%	3.1%	5.2%	**4.3%**	**4**
Sri Lanka	94	244	98	**436**	1.2%	4.8%	5.6%	**2.9%**	**5**
Viet Nam	125	182		**405**	1.6%	3.6%	5.6%	**2.7%**	**6**
Bangladesh	169	118	< 58	**343**	2.1%	2.3%	< 3.6%	**2.3%**	**7**
Saudi Arabia	121	106	77	**304**	1.5%	2.1%	4.4%	**2.0%**	**8**
Indonesia	107	110	61	**278**	1.3%	2.2%	3.5%	**1.9%**	**9**
Nepal	172	66	< 37	**273**	2.1%	1.3%	< 3.0%	**1.8%**	**10**
Hong Kong (SAR of China)	64	141	< 57	**261**	0.8%	2.8%	< 3.6%	**1.8%**	**11**
Iran	162	15	< 9	**182**	2.0%	0.3%	< 0.8%	**1.2%**	**12**
Singapore	15	129	< 35	**178**	0.2%	2.5%	< 2.3%	**1.2%**	**13**
Kuwait	5	122	22	**149**	0.1%	2.4%	1.3%	**1.0%**	**14**
Thailand	40	60	< 11	**110**	0.5%	1.2%	< 0.9%	**0.7%**	**15**
Iraq	45	< 5		**46**	0.6%	< 0.2%	0.0%	**0.3%**	**16**
All other Countries	903	728	280	**1,911**	11.2%	14.4%	16.0%	**12.8%**	
Total on-shore	**8,059**	**5,072**	**1,746**	**14,877**					
Total international (from Table 5)	**9,911**	**7,482**	**1,917**	**19,310**					

TABLE 10 INDIGENOUS COMMENCEMENTS AND COMPLETIONS IN ENGINEERING & RELATED TECHNOLOGIES, 2015, 2017 and 2018

Commencements

	P/G by Research	P/G C'rsewk	Bach. (inc Hons)	Other	Total		
	Persons	Persons	Persons	Persons	Male	Female	Persons
2015							
ACT	0	0	0	0	0	0	0
NSW	< 5	< 5	28	< 5	np	< 5	32
NT	0	0	< 5	< 5	np	< 5	7
QLD	< 5	< 5	45	14	52	12	64
SA	0	0	7	< 5	8	0	8
TAS	0	< 5	11	0	12	0	12
VIC	0	< 5	7	< 5	np	< 5	15
WA	0	< 5	6	0	np	< 5	7
Total	**< 5**	**12**	**108**	**23**	**124**	**21**	**145**
2017							
ACT	< 5		0	0	0	< 5	< 5
NSW	9		38	<< 10	42	8	50
NT	0		< 5	<< 10	< 5	< 5	< 5
QLD	< 5		65	7	58	18	76
SA	< 5		10	< 5	13	< 5	14
TAS	< 5		5	0	6	0	6
VIC	< 5		12	<< 10	15	< 5	17
WA	< 5		12	0	9	5	14
Total	**21**		**143**	**< 19**	**146**	**36**	**182**
2017							
ACT	0		< 5	0	< 5	0	< 5
NSW	6		34	< 10	36	11	47
NT	0		7	<< 10	8	3	10
QLD	< 5		55	5	52	10	62
SA	0		9	< 5	10	3	13
TAS	< 5		< 5	0	< 5	0	< 5
VIC	5		9	<< 10	13	2	16
WA	< 5		< 5	<5	5	2	7
Total	**17**		**120**	**22**	**128**	**31**	**159**

Completions

	P/G by Research	P/G C'rsewk	Bach. (inc Hons)	Other	Total		
	Persons	Persons	Persons	Persons	Male	Female	Persons
2015							
ACT	< 5	0	0	0	0	< 5	< 5
NSW	0	5	12	0	np	< 5	17
NT	0	0	0	< 5	< 5	0	< 5
QLD	0	< 5	13	0	np	< 5	16
SA	0	0	< 5	0	< 5	0	< 5
TAS	0	< 5	< 5	0	< 5	0	< 5
VIC	< 5	< 5	< 5	< 5	np	< 5	7
WA	0	0	< 5	0	< 5	0	< 5
Total	**< 5**	**11**	**34**	**< 5**	**43**	**6**	**49**
2017							
ACT	0		0	0	0	0	0
NSW	< 5		8	< 5	9	3	12
NT	0		0	0	0	0	0
QLD	< 5		19	<<5	23	2	25
SA	0		< 5	<<5	< 5	0	< 5
TAS	0		< 5	< 5	< 5	0	< 5
VIC	0		< 5	0	< 5	0	< 5
WA	< 5		<5	0	5	0	5
Total	**8**		**34**	**< 10**	**45**	**5**	**50**
2018							
ACT	0		< 5	0	< 5	0	< 5
NSW	5		14	0	17	2	19
NT	0		< 5	1	< 5	< 5	< 5
QLD	0		23	1	19	5	24
SA	0		6	0	6	0	6
TAS	0		< 5	0	< 5	0	< 5
VIC	< 5		< 5	1	< 5	0	< 5
WA	< 5		< 5	0	< 5	0	< 5
Total	**6**		**52**	**3**	**53**	**8**	**61**

TABLE 11 GRADUATE EMPLOYMENT AND MEDIAN SALARIES

(a) Employment status, survey years 2016-19

Year of Survey (previous year graduates)	% in full-time study	% in work, of all avail-able for any work	% in FT work, of all avail-able for FT work	% in PT work of all employ ed	% in PT work seeking more hours	% in PT work not seeking more hours	% of FT employed reporting skills not fully used	% of all employed reporting skills not fully used	% of FT employed reporting skills not fully used because of lack of jobs in area of expertise	% of all employed reporting skills not fully used because of lack of jobs in area of expertise
2017										
U/G Engineering	14.2	86.5	79.4	18.0	9.9	6.0	24.3	33.7	29.8	31.0
ALL U/G	20.7	86.5	71.8	37.9	19.7	14.2	28.2	41.1	27.4	25.2
P/G C'swk Engin'g		88.9	86.0				35.1	37.8	27.1	30.8
ALL P/G Coursew'k		92.6	86.1				28.1	30.9	25.3	25.5
P/G Res'ch Engin'g		86.1	74.3				22.1	26.2		
All Research		90.6	80.4				25.2	29.9		
2018										
U/G Engineering	15.0	88.2	83.1	16.4	9.1	5.6	21.6	29.7	26.4	25.6
ALL U/G	18.7	87.0	72.9	37.3	19.2	14.0	27.1	38.9	23.5	23.0
P/G C'swk Engin'g		88.8	84.6				32.1	34.6	21.5	23.0
ALL P/G Coursew'k		92.9	86.9				26.9	29.2	22.7	22.9
P/G Res'ch Engin'g		90.7	85.0				24.8	27.0		
All Research		91.8	82.3				24.5	27.9		
2019										
U/G Engineering	12.8	84.8	88.4							
ALL U/G	18.9	72.2	86.8							
P/G C'swk Engin'g										
ALL P/G Coursew'k	6.0	86.8	92.7							
P/G Res'ch Engin'g										
All Research	5.8	81.1	90.7							

(b) Graduate salaries (medians) for full-time work

Course level	2015 male	2015 male	2016 male	2016 male	2017 male	2017 male	2019 male	2019 female
U/G Engineering	$ 60,000	$ 62,600	$ 62,300	$ 63,500	$ 62,600	$ 62,300	$ 67,800	$ 67,000
ALL U/G	$ 55,000	$ 60,000	$ 56,400	$ 60,100	$ 60,000	$ 56,400	$ 64,700	$ 61,500
P/G Coursework Engineering	$ 100,000	$ 98,600	$ 85,000	$ 90,000	$ 98,600	$ 85,000		
ALL P/G	$ 90,000	$ 90,000	$ 75,700	$ 91,000	$ 90,000	$ 75,700	$ 85,300	
P/G Research Engineering	$ 82,800	$ 85,000	$ 82,000	$ 87,700	$ 85,000	$ 82,000		
ALL P/G Research	$ 84,000	$ 88,300	$ 83,300	$ 89,800	$ 88,300	$ 83,300	$ 90,000	

Note: undergraduate figures are for graduates in first full time employment, age less than 25

(c) Median salary comparisons for Bachelors Graduates, surveys 2012-18

	2013	2014	2015	2016	2017	2018	2019
Dentistry	$ 80,000	$ 75,000	$ 80,000	$ 83,500	$ 78,300	$ 83,000	$ 88,200
Medicine	$ 60,000	$ 60,000	$ 65,000	$ 69,200	$ 70,300	$ 73,000	$ 73,100
Engineering	**$ 64,000**	**$ 62,000**	**$ 60,000**	**$ 62,600**	**$ 64,000**	**$ 65,000**	**$ 67,500**
Computing & Information systems	$ 52,500	$ 55,000	$ 54,000	$ 60,000	$ 59,900	$ 60,000	$ 60,000
Science & Mathematics	$ 57,000	$ 60,000	$ 60,000	$ 55,200	$ 57,500	$ 61,000	$ 60,000
Business & Management	$ 49,000	$ 50,000	$ 50,000	$ 55,000	$ 55,200	$ 58,000	$ 59,500

TABLE 12 GRADUATE SATISFACTION AND EMPLOYER SATISFACTION

(a) **Graduate satisfaction surveys 2018 and 2019.** Percentages of graduates expressing agreement or strong agreement with a relevant satisfaction statement

	Overall satisfact'n	Good teaching	Generic skills	Super-vision	Intellect'l climate	Skills develop't	Infra-structre	Thesis examin'n	Goals & expect's
2018									
U/G Engineering	**74.8**	**49.7**	**82.9**						
Science & Mathematics	83.9	67.8	84.5						
Computing & Info Systems	74.7	59.7	78.7						
Pharmacy	84.1	62.9	84.1						
Business & Management	76.9	56.7	78.9						
U/G All fields	**79.7**	**62.9**	**81.3**						
P/G Coursework Engineering	**78.3**	**63.1**	**83.6**						
P/G Coursework All fields	81.7	68.7	78.4						
P/G Research Engineering	**87.5**			**81.0**	**66.1**	**93.0**	**81.5**	**83.2**	**92.5**
P/G Research All fields	85.0			82.0	61.1	92.6	74.6	81.3	91.7
2019									
U/G Engineering	**74.4**	**49.4**	**83.8**						
Science & Mathematics	84.0	67.5	85.7						
Computing & Info Systems	72.9	59.7	77.6						
Pharmacy	80.5	64.6	80.8						
Business & Management	78.0	58.6	79.7						
U/G All fields	**80.1**	**63.7**	**82.4**						

(b) **Employer Satisfaction Surveys 2017 - 2019 – skills areas, selected fields of education.**
Data are percentages of employers expressing agreement or strong agreement with a relevant statement on graduate skills. Previous year data in parentheses.

Field of education	Foundation	Adaptive	Collaborative	Technical	Employability	Overall satisfaction
2017 All fields	93.4	90.1	85.9	93.3	85.0	83.6
2018 All fields	93.5	89.9	88.7	93.8	86.5	84.8
2019 All fields	**92.7**	**89.3**	**87.8**	**92.7**	**85.4**	**84.0**
Engineering & Related Technologies	**97.1 (95.0)**	**90.4 (88.3)**	**91.7 (88.6)**	**97.1 (94.4)**	**88.2 (83.3)**	**89.9 (86.9)**
Natural & Physical Sciences	95.4 (97.3)	91.3 (90.9)	92.3 (93.0)	94.3 (96.3)	90.0 (89.4)	82.8 (87.0)
Information Technology	91.5 (92.9)	86.9 (89.7)	87.9 (90.5)	92.3 (94.4)	82.1 (84.6)	89.9 (87.2)
Health	93.9 (93.5)	90.1 (89.1)	88.1 (86.8)	94.4 (93.9)	84.1 (84.8)	86.9 (86.6)
Management & Commerce	92.5 (92.8)	89.3 (88.4)	87.8 (87.4)	92.7 (92.0)	85.4 (88.2)	84.0 (83.4)

(c) Employer Satisfaction Survey 2019 – importance ratings by graduates and their supervisors, selected fields of education. Previous year data in parentheses.

Field of education	% of respondents rating qualification 'important' or 'very important' for current employment		% of respondents rating 'well' or 'very well' the extent to which qualification prepared graduates for current employment	
	Graduates	Supervisors	Graduates	Supervisors
All fields	**53.2 (56.5)**	**62.3 (63.8)**	**87.1 (88.1)**	**92.2 (92.1)**
Engineering & Related Technologies	**59.2 (59.2)**	**67.7 (67.7)**	**87.5 (89.0)**	**92.7 (92.3)**
Natural & Physical Sciences	47.2 (46.7)	60.1 (61.5)	81.8 (84.2)	93.7 (91.0)
Information Technology	41.1 (47.8)	48.4 (45.3)	84.4 (85.4)	90.4 (91.6)
Health	70.2 (74.2)	79.2 (79.3)	89.9 (92.5)	94.9 (93.4)
Management & Commerce	42.3 (39.1)	48.1 (49.4)	87.7 (87.3)	92.1 (91.3)

TABLE 13 ACADEMIC STAFF (FTE) IN ENGINEERING & RELATED TECHNOLOGIES, 2008-18 (not including casual staffing, DET data)

(a) Academic staff (FTE) by gender and functional category

staff categories	2008	2009	2010	2011	2012	2013	2014*	2015	2016	2017	2018
academics, male											
teaching-only	38	51	69	100	98	76	67	88	127	121	130
research –only	1,010	1,082	1,051	1,194	1,194	1,295	1,279	1,417	1,344	1,304	1,326
teaching & research	1,529	1,611	1,602	1,747	1,759	1,755	1,824	1,919	1,907	1,839	1,639
sub-total, male	**2,577**	**2,744**	**2,722**	**3,040**	**3,052**	**3,126**	**3,170**	**3,424**	**3,378**	**3,264**	3,095
academics, female											
teaching-only	3	9	13	16	20	18	17	24	33	38	43
research –only	262	315	333	387	383	399	371	399	360	366	356
teaching & research	181	218	236	252	248	257	288	320	328	307	310
sub-total, female	**446**	**543**	**621**	**656**	**652**	**675**	**676**	**743**	**721**	**711**	709
total academics	**3,023**	**3,287**	**3,343**	**3,696**	**3,704**	**3,801**	**3,846**	**4,167**	**4,099**	**3,975**	3,804
% research-only	42.1%	42.5%	41.4%	42.8%	42.6%	44.6%	42.9%	43.6%	41.6%	42.0%	44.2%
% female	14.8%	16.5%	18.6%	17.7%	17.6%	17.8%	17.6%	17.8%	17.6%	17.9%	18.6%
total teaching	**1,751**	**1,889**	**1,920**	**2,115**	**2,125**	**2,106**	**2,196**	**2,351**	**2,395**	**2,305**	**2,122**

(b) Academic staff (FTE) by gender and level of appointment

		D, E	C	B	< B	other
2013	**Men**	907	692	796	553	178
	Women	104	104	204	169	95
2014	**Men**	951	675	826	537	184
	Women	115	111	201	156	85
2015	**Men**	1031	751	908	636	99
	Women	127	132	212	201	61
2016	**Men**	1078	735	867	618	80
	Women	145	132	198	191	56
2017	**Men**	1061	693	764	663	83
	Women	132	129	195	208	47
2018	**Men, Total**	989	651	696	689	73
	Women, Total	132	127	215	196	38
2018	**Men, Research-only**	178	136	359	580	73
	Women, Research-only	29	34	94	161	38

Note: Seven ACED member universities, did not provide staffing data for FoE3 to the Higher Education Statistics Unit in 2018. The total FTE are likely to be at least 10% higher than the above figures.

TABLE 14 STUDENT SUMMARY DATA FOR ACED MEMBERS, 2018

University	Commencing students					Completions			Total enrolled students			Load
	domestic		international		total	dom	int'nat	total	dom	int'nat	total	EFTSL
	#	% fem	#	%fem								
Charles Sturt Uni	36	30.6%	0		36	11	3	14	91	0	91	70
Macquarie Uni	273	15.0%	184	20.7%	457	77	79	156	866	444	1,310	704
Southern Cross Uni	97	21.6%	275	5.8%	372	45	0	45	246	301	547	139
The Uni of Newcastle	594	20.4%	297	16.2%	891	302	125	427	1,975	806	2,781	1,898
The Uni of Sydney	769	30.9%	1,070	36.1%	1,839	538	862	1,400	3,273	3,136	6,409	5,012
UNSW (inc. Canberra)	2,231	24.3%	2,899	26.2%	5,130	1,534	1,914	3,448	7,924	7,230	15,154	9,365
Uni of Tech Sydney	1,064	17.7%	972	14.0%	2,036	522	843	1,365	3,971	2,774	6,745	5,213
Uni of Wollongong	450	15.1%	711	17.3%	1,161	311	416	727	1,701	1,822	3,523	2,568
Western Sydney Uni	712	10.3%	465	11.0%	1,177	200	178	378	1,936	998	2,934	2,389
Deakin University	334	11.7%	716	9.8%	1,050	151	385	536	1,262	1,663	2,925	1,934
Federation Uni Aust	129	15.5%	154	8.4%	283	72	21	93	354	281	635	297
La Trobe University	86	7.0%	237	13.5%	323	73	95	168	313	437	750	520
Monash University	983	23.5%	1,456	24.0%	2,439	598	916	1,514	4,227	4,692	8,919	5,829
RMIT University	1,682	16.1%	1,711	15.5%	3,393	1,243	1,197	2,440	5,431	4,868	10,299	6,771
Swinburne U of Tech	937	15.7%	1,383	13.7%	2,320	508	827	1,335	3,157	3,554	6,711	4,738
The Uni of Melbourne	418	25.4%	1,087	31.1%	1,505	427	996	1,423	1,269	2,913	4,182	3,902
Victoria University	183	14.2%	239	11.7%	422	90	135	225	520	548	1,068	829
CQ University	327	11.0%	298	8.1%	625	190	60	250	1,073	514	1,587	924
Griffith University	566	18.0%	336	14.6%	902	378	223	601	1,729	822	2,551	1,605
James Cook University	142	20.4%	9	66.7%	151	95	9	104	549	40	589	382
Queensland U of Tech	1,201	18.7%	364	16.8%	1,565	600	251	851	4,145	995	5,140	3,065
The Uni of Queensl'nd	906	22.3%	528	27.1%	1,434	717	420	1,137	3,879	1,659	5,538	4,086
Uni of Southern Qld	916	9.7%	133	15.8%	1,049	497	112	609	3,278	432	3,710	1,541
Uni of Sunshine Coast	129	18.6%	17	17.6%	146	49	2	51	409	33	442	217
Curtin Uni of Tech	744	11.2%	666	20.4%	1,410	540	723	1,263	2,996	3,013	6,009	4,124
Edith Cowan Uni	250	11.6%	469	15.1%	719	107	308	415	708	1,318	2,026	1,075
Murdoch University	107	25.2%	80	21.3%	187	79	56	135	407	164	571	313
The University of WA	280	20.4%	277	18.8%	557	433	234	667	1,137	772	1,909	1,883
Flinders University	191	20.4%	96	22.9%	287	84	62	146	675	240	915	675
The Uni of Adelaide	633	17.9%	552	18.8%	1,185	481	358	839	2,387	1,617	4,004	2,610
Uni of South Australia	361	18.6%	423	19.4%	784	304	244	548	1,200	1,000	2,200	1,415
Uni of Tasmania	263	13.3%	260	15.8%	523	225	208	433	873	693	1,566	1,025
Charles Darwin Uni	156	19.9%	66	16.7%	222	45	61	106	333	202	535	313
The Aust National Uni	152	23.0%	192	23.4%	344	131	152	283	729	662	1,391	942
Uni of Canberra	49	8.2%	11	27.3%	60	14	11	25	107	27	134	153
TOTAL 2018	**18,351**	**18.2%**	**18,633**	**19.2%**	**36,984**	**11,671**	**12,486**	**24,157**	**65,130**	**50,670**	**115,800**	**78,526**
TOTAL 2017	**18,272**	**16.7%**	**17,783**	**20.2%**	**36,055**	**11,196**	**10,436**	**21,632**	**65,508**	**46,097**	**111,605**	**75,875**
% change 2017 to 2018	0.45	1.5%	4.7%	-1.0%	2.6%	4.2%	19.6%	11.6%	-1.8%	9.9%	3.7%	3.4%

Notes

Data source: Higher Education Statistics uCube website for FoE03 Engineering and Related Technologies

Engineering and Related Technologies includes surveying, maritime, and civil aviation, and may not include software engineering, if the university classifies the latter in IT

UNSW Canberra is a member of ACED but data are included with UNSW

Totals are a few percent less than those in Tables 1, 3 and 6 because of non-inclusion of private and TAFE providers.

International numbers highlighted include offshore.

TABLE 15 SUMMARY OF ENGINEERING COURSEWORK PROGRAMS OFFERED IN AUSTRALIA BY ACED MEMBERS , 2019

University (ACED member)	EA accredited programs					advanced "MEngSci" awards	"M-mgt" awards
	Assoc Deg /Adv Dip	BEngTech branches	BEng(Hons) branches	dual degree options	MEng branches		
Charles Sturt University	-	1 P	-	-	1 P	-	-
Macquarie University	-	-	5 F, 1 P	3	-	-	-
Southern Cross University	-	-	1 F, 3 P	-	-	-	2
University of New South Wales (NSW)	-	-	21 F, 1 P	5	5 F, 1 P	25	2
The University of Newcastle	-	-	8 F, 1 P	9	8 P	9	1
The University of Wollongong	-	-	10 F	8	5 F, 5 P	1	2
University of Sydney	-	-	16 F	7	8 F, 4 P	14	2
University of Technology Sydney	-	-	8 F, 2P	5	3 P	10	2
Western Sydney Uniy (inc. College)	4 P	5 P	5 F	6	6 F	-	-
Deakin University	-	-	4 F	-	-	3	1
Federation University Australia	-	-	6 F, 1 P	-3	3 F	1	1
La Trobe University	-	-	2 P	-	-	2	1
Monash University	-	-	9 F	8	-	9	1
RMIT University	7	-	12 F, 1 P	5	1 P	8-	
Swinburne University of Technology	-	-	8 F, 1 P	3	-	17	1
The University of Melbourne	-	-	-	-	11 F, 2P	4	1
Victoria University			4 F, 1P-	-	-	5	-
Central Queensland University	3 F, 1 P	3 F	3 F	-	3 P	-	3
Griffith University	-	-	6 F	4	-	4	2
James Cook University	-	-	4 F	2	-	-	-
Queensland University of Technology	-	-	8 F	4	4 P	2	2
The University of Queensland	-	-	8 F	9	6 P	7	1
University of Southern Queensland	6 F, 3P	8 F	9 F	3	13 F, 2P	1-	2
University of the Sunshine Coast	-	-	2 F	1	-	-	-
Curtin University of Technology		1 F	8 F	2	-	11	1
Edith Cowan University	--	1 F	13 F, 3 P		6 F, 4 P-	-	-
Murdoch University	1 P	-	5 F, 1P	-	-	3	-
The University of Western Australia	-	-	-	-	6 F, 1 P	-	1
Flinders University	-	-	8 F	5	2 F, 2P	6	-
The University of Adelaide	-	-	17 F	5	9 F-	3	-
University of South Australia	-	-5	5 F, 1 P		-	5	2
University of Tasmania (inc. AMC)	-	-	7 F	1	2 P	-	-
Charles Darwin University	-	1 F, 3 P	4 F	-	4 F	-	-
The Australian National University	-	-	5 F, 1P	14	3P	4-	2
University of Canberra	-	-	1 F	-	-	2	-
UNSW Canberra at ADFA	-	2 F	4 F	2	-	4	1

Notes:

1. EA accredition status from EA weblist, viewed 22 Jan 2019 F: Full Accreditation, P: Provisional Accreditation
2. "MEngSci" and "M-mgt" programs from provider websites.
3. "Branches": the number of branches of engineering covered (not necessarily the total number of accredited programs); double majors are not counted separately from constituent single majors.
4. "Dual degrees": the number of areas in which an additional Bachelors degree outside engineering may be taken (includes "dual", "combined", "double" and "concurrent" models).
5. UNSW and UQ offer MEng extensions to selected BEng(Hons) degrees.
6. UTS offers a BEng(Hons) Diploma of Engineering Practice including extended industrial experience placement(s), this restricts dual degrees options.
7. CQU offers a BEng(Hons) Diploma of Professional Practice (Co-op Engineering) including extended industry placements

TABLE 16 ACCREDITED BENG(HONS) AND MENG PROGRAMS BY BRANCH OF ENGINEERING, OFFERED BY ACED MEMBERS, 2019

(a) In Australia

ACED member	Civil	Environmental	Chemical, Materials	Mining, Met, Petroleum	Electrical, Renew' Energy	Electronic, Comp Syst, Telecoms	Software	Biomedical	Mechanical, Manuf, Ind	Aerospace	Mechatronics, Robotics	Naval Arch, Mar, Ocean
Charles Sturt U	1M											
Macquarie						3B	1B		1B			1B
Southern Cross U	2B[10]	1B							1B			
UNSW (NSW)	4B[15], 1M	1B, 1M	5B[16]	4B[16]	2B[17], 1M	2B, 1M	2B[18]		2B, 1M	1B	1B	1B
U of Newcastle	1B[19], 1M	1B, 1M	1B, 1M		2B, 1M[4]	1B[19], 1M	1B, 1M		1B[19], 1M		1B[19], 1M	
U of Wollongong[26]	1B, 1M	1B, 1M	1B, 1M	1B, 1M	1B, 1M	2B, 2M		1B	1B, 2M		1B, 1M	
U of Sydney	4B, 3M	1B	1B, 1M		2B, 2M	2B, 1M	1B, 1M	1B, 1M	1B[23], 2M	2B. 1M	1B[23]	
UTS[3]	1B, 1M	1B			2B	1B		1B, 1M	3B[24], 1M		1B	
WSU	2B, 1M	1M			1B, 1M	1M			1B, 1M		1B, 1M	
Deakin U	1B				1B[4]				1B		1B	
Federation U	1B, 1M			1B, 1M					1B, 1M			
La Trobe	1B								1B			
Monash	1B	1B	2B		1B[6]		1B		1B	1B	1B	
RMIT	1B	1B	1B		2B, 1M[4]	3B		1B	3B[9]	1B		
Swinburne	1B				1B[4]	2B	1B	1B	2B[11]		1B	
U of Melbourne	4M[14]	1M	3M		1M[4]		1M	1M	1M		1M	
VU	2B[25]				2B[4]				1B			
CQU[3]	1B, 1M				1B, 1M				1B, 1M			
Griffith	1B				1B[4]				1B			
JCU	1B		1B		1B[4]				1B			
QUT	1B		1B		1B, 2M	1B		1B	1B, 2M	1B[8]	1B	
U of Queensland[20]	2B, 2M	1B	5B, 1M	2B	1B. 1M	1B	1B, 1M	1B	2B. 1M	1B	1B	
USQ[22]	1B, 3M[15]	1B, 1M			2B, 2M[4]	1B			2B, 2M[21]		2B	
U Sunshine Coast	1B								1B			
Curtin	1B		3B	1B	1B[4]				1B		1B	
ECU	1B, 1M	2B[5]	1B, 1M	1M	2B, 2M	2B, 2M			1B, 1M		2B, 2M	3B[1]
Murdoch		1B	1B		2B	2B[7]						
UWA	1M	1M	1M	1M	1M[4]		1M		1M			
Flinders	1B, 1M		1M		1B	2B, 1B	1B	1B, 1M	1B		1B	
U of Adelaide	3B, 2M[12]		3B, 1M	6B[12], 1M	2B[4],1M	2B[12], 1M	1B		6B, 1M	1M	1B,1M	
UniSA	2B				2B[4]				2B		2B	
UTas (inc. AMC)	1B, 1M				2B[4]	1B			1B			3B, 1M
CDU	1B, 1M		1B, 1M		B[4],1M[4]				1B, 1M			
ANU					1B, 1M	1B, 1M	2B[2]	1B	1B		1B, 1M	
Canberra						1B[13]						
UNSW (Canberra)	1B				1B				1B	1B		

Notes:

Branches are taken from the Engineers Australia Accredited Program Listing, Jan 2020. B: Bachelor (Honours); M: Master degree

1. Joint with UTas (AMC)
2. Includes one named "Photonic Systems"
3. Also offered in co-op mode with an additional Diploma
4. Includes at least one named: "Electrical & Electronic"
5. With either Chemical or Civil Engineering
6. Named "Electrical & Computer Systems"
7. Named "Industrial Computer Systems" and "Instrumentation & Control"
8. Named "Electrical & Aerospace"

9. Includes one named “Sustainable Systems”
10. Includes one named “Coastal Engineering”
11. Named “Product Engineering”
12. Combinations: “Civil &Structural”, “Civil &Environmental”, Electrical & Sustainable Energy”, “Mechanical & Aerospace”, etc.
13. Named “Network & Software Engineering”
14. Includes “Architectural” and “Spatial”
15. Includes “Surveying” and “Geospatial”
16. Includes: “Industrial Chemistry”, BEng in Materials Science and Engineering with named majors in Ceramic Engineering, Materials Engineering, Physical Metallurgy and Process Metallurgy
17. Includes “Photovoltaics & Solar Energy”
18. Includes “Bioinformatics”
19. Plus degree combinations: “Civil with Environmental”, “Elec & Electronics with Computer Systems”, “Mechanical with Mechatronics” and “Mechatronics with Elec & Electronics”
20. Disciplines may be taken in several combinations, and as BEng/MEng dual degrees
21. Includes “Agricultural Engineering”
22. Most Masters degrees are offered as MEng.Sci and MEngPrac – only one recorded per branch
23. Branches also offered with a “Space” option: Aeronautical/Space” is counted as the second Aero program
24. Includes: “Innovation Engineering”, and “General Engineering”
25. Incudes “Architectural Engineering”
26. BEng degrees also offered in several dual major combinations.

(b) Offshore (EA weblist January 2020)

ACED member	Civil	Environmental	Chemical	Petroleum	Electrical	Electronic, Comp Syst, Telecoms	Software	Mechanical,	Mechatronics, Robotics
U of Newcastle									
in Singapore	1B				1B[4]	1B			1B
U of Wollongong									
in Dubai	1B				1B	2B		1B	
Monash									
in Malaysia	1B		1B			1B[6]	1B	1B	1B
RMIT									
in Hong Kong	1B				1B			1B	
in Vietnam					1B	1B, 1M	1B		
Swinburne									
in Sarawak, Malaysia	1B				1B[4]			1B	1B
Curtin									
in Sarawak, Malaysia	1B	1B	1B	1B	1B			1B	
in Sri Lanka	1B				1B[4]			1B	

TABLE 17 SUBFIELDS IN ASCED FIELDS OF EDUCATION 03 ENGINEERING AND RELATED TECHNOLOGIES and 02 INFORMATION TECHNOLOGY

03 ENGINEERING AND RELATED TECHNOLOGIES

0301	**MANUFACTURING ENGINEERING AND TECHNOL'Y**
030101	Manufacturing Engineering
030103	Printing
030105	Textile Making
030107	Garment Making
030109	Footwear Making
030111	Wood Machining and Turning
030113	Cabinet Making
030115	Furniture Upholstery and Renovation
030117	Furniture Polishing
030199	Manufacturing Engineering and Technology, n.e.c.
0303	**PROCESS AND RESOURCES ENGINEERING**
030301	Chemical Engineering
030303	Mining Engineering
030305	Materials Engineering
030307	Food Processing Technology
030399	Process and Resources Engineering, n.e.c.
0305	**AUTOMOTIVE ENGINEERING AND TECHNOLOGY**
030501	Automotive Engineering
030503	Vehicle Mechanics
030505	Automotive Electrics and Electronics
030507	Automotive Vehicle Refinishing
030509	Automotive Body Construction
030511	Panel Beating
030513	Upholstery and Vehicle Trimming
030515	Automotive Vehicle Operations
030599	Automotive Engineering and Technology, n.e.c.
0307	**INDUSTRIAL ENGINEERING AND TECHNOLOGY**
030701	Mechanical Engineering
030703	Industrial Engineering
030705	Toolmaking
030707	Metal Fitting, Turning and Machining
030709	Sheetmetal Working
030711	Boilermaking and Welding
030713	Metal Casting and Patternmaking
030715	Precision Metalworking
030717	Plant and Machine Operations
030799	Mechanical and Industrial Eng'g and Tech'y, n.e.c.

0309	**CIVIL ENGINEERING**
030901	Construction Engineering
030903	Structural Engineering
030905	Building Services Engineering
030907	Water and Sanitary Engineering
030909	Transport Engineering
030911	Geotechnical Engineering
030913	Ocean Engineering
030999	Civil Engineering, n.e.c.
0311	**GEOMATIC ENGINEERING**
031101	Surveying
031103	Mapping Science
031199	Geomatic Engineering, n.e.c.
0313	**ELECTRICAL & ELECTRONIC ENG'G AND TECHNOL'Y**
031301	Electrical Engineering
031303	Electronic Engineering
031305	Computer Engineering
031307	Communications Technologies
031309	Communications Equip't Installation & Mainten'ce
031311	Powerline Installation and Maintenance
031313	Electrical Fitting, Electrical Mechanics
031315	Refrigeration and Air Conditioning Mechanics
0315	**AEROSPACE ENGINEERING AND TECHNOLOGY**
031501	Aerospace Engineering
031503	Aircraft Maintenance Engineering
031505	Aircraft Operation
031507	Air Traffic Control
031599	Aerospace Engineering and Technology, n.e.c.
0317	**MARITIME ENGINEERING AND TECHNOLOGY**
031701	Maritime Engineering
031703	Marine Construction
031705	Marine Craft Operation
031799	Maritime Engineering and Technology, n.e.c.
0399	**OTHER ENGINEERING AND RELATED TECHNOLOGIES**
039901	Environmental Engineering
039903	Biomedical Engineering
039905	Fire Technology
039907	Rail Operations
039909	Cleaning
039999	Engineering and Related Technologies, n.e.c.

02 INFORMATION TECHNOLOGY

0201	**COMPUTER SCIENCE**
020101	Formal Language Theory
020103	Programming
020105	Computational Theory
020107	Compiler Construction
020109	Algorithms
020111	Data Structures
020113	Networks and Communications
020115	Computer Graphics
020117	Operating Systems
020119	Artificial Intelligence
020199	Computer Science, n.e.c.

0203	**INFORMATION SYSTEMS**
020301	Conceptual Modelling
020303	Database Management
020305	Systems Analysis and Design
020307	Decision Support Systems
020399	Information Systems, n.e.c.
0299	**OTHER INFORMATION TECHNOLOGY**
029901	Security Science
029999	Information Technology, n.e.c

Source: http://www.abs.gov.au/ausstats/abs@.nsf/0/53B75DFA4C63C20ACA256AAF001FCA6F?opendocument)

APPENDIX 2 NATIONAL DATA ON SUB PROFESSIONAL ENGINEERING DEGREE QUALIFICATIONS IN ENGINEERING AND RELATED TECHNOLOGIES

This information was provided as a paper to ACED in November 2019. It is presented here with minor modifications and updates.

Preamble

Australia's STEM Workforce report (2016) from the Office of the Australian Chief Scientist used 2011 Census data to report the numbers of people (above age 15) in the Australian population with their highest qualification in each field of education. Relevant data for this paper are:

Qualification	Engineering & Related Technologies	Total STEM	Total Non-STEM
Doctorate	10,634	53,721	62,825
Masters	39,686	114,662	390,200
Grad Cert/Grad Dip	6,708	27,761	266,743
Bachelor	200,356	508,168	1,769,902
Higher Education total	**257,384**	**703,862**	**2,489,670**
Adv Dip/Dip	149,327	263,583	1,102,289
Cert III/IV	1,006,009	1,117,011	1,409,918
Cert other	41,347	88,807	379,011
VET total	**1,196,683**	**1,469,401**	**2,891,218**
Inadequate data to assign level	55,873	83,808	322,053
TOTAL	**1,509,940**	**2,257,071**	**5,702,943**

Overall about 8 million (more than a third) of the population (above age 15) have a post-school qualification, and about one third of these are in STEM. Amongst this group:

- Engineering dominates Certificate III and IV qualifications in STEM. These Certificate III qualifications include the 'engineering trades' in which apprenticeships are common. Note that Building trades are in the Non-STEM numbers, under FoE04 Architecture and Building;
- there are relatively low numbers of Diploma and Advanced Diploma holders in Engineering; less than the number of Bachelor degree holders.

There is no specific accounting of the sub-degree higher education qualification (Associate Degree) in these data. The Bachelor degree data cover those who gained their qualification before the Bachelor Honours degree became the 4-year professional engineering qualification.

The Office of the Chief Scientist is currently working on a revised edition of the STEM Workforce publication using 2016 Census data: it will be interesting to see the gross changes and trends.

The main focus of this paper is on the recent domestic numbers and trends in sub-degree qualifications in Engineering.

Clearly, Higher Education Associate Degrees, Advanced Diplomas and Diplomas add to the VET provision of qualifications at AQF Levels 5 and 6. Engineers Australia accredits programs at Level 6 that meet the educational requirements for the occupation of Engineering Associate. This occupational specification is at the higher end of technician work, given that engineering technicians are expected to possess at least a Level 5 qualification.

EA's *The Engineering Profession: a statistical overview* (14th ed. June 2019) includes professional engineers, engineering technologists and engineering associates within its definition of 'qualified engineers'. This EA report provides data up to 2017 on Associate Degree and Advanced Diploma completions from both HEd and VET providers, and notes a very significant downturn in the combined total from 1,828 in 2013 to 978 in 2017.

Following is more detail on these and the lower level qualifications, including by branch of engineering, mindful that these may be increasingly important pathways into higher level qualifications and engineering work. The paper concludes with a brief commentary, including on 3-year degrees.

VET Completions 2015 – 2018

The top part of Table 1 shows clearly that VET completion numbers in Engineering for all qualification levels have declined since 2015, although Certificate III numbers picked up in 2018. There was a similar trend for Building, although Advanced Diploma in 2018 exceeded those of 2015. In Information Technology, Diploma completions have declined as Bachelor degree enrolments have grown at rapidly. The Certificate III qualification is entirely in *Information Systems*.

Growth of Bachelor Honours degree graduations in Engineering is also evident, especially in 2018, assuming that the 3-year Bachelor degree graduations are similar in number to previous years.

Table 1 Number of Domestic Completions in Engineering, Building (VET only) and IT

Field of Education Qualification	**2015**	**2016**	**2017**	**2018**
03 - Engineering and related technologies				
HEd Bachelor Hons degrees (4Yr)	7,110	7,244	7,214	7,718
HEd Bachelor degrees (3Yr)	524	544	549	578
HEd Dip, Adv Dip & Assoc Deg	817	824	793	829
VET Advanced Diploma	1,334	1,047	901	745
VET Diploma	2,576	2,514	2,218	1,908
VET Certificate IV	14,563	11,565	9,703	8,808
VET Certificate III	62,239	49,266	46,624	47,003
0403 Building				
VET Advanced Diploma	182	214	146	293
VET Diploma	2,347	3,014	2,118	2,045
VET Certificate IV	8,242	7,737	6,948	6,039
VET Certificate III	19,236	13,149	13,399	15,194
02 Information Technology				
HEd Bachelor degrees	3,591	3,544	3,876	4,102
HEd Dip, Adv Dip & Assoc Deg	358	427	529	593
VET Advanced Diploma	600	588	536	516
VET Diploma	1,844	1,961	1,874	1,475
VET Certificate IV	1,944	1,851	1,966	1,972
VET Certificate III	3,280	2,831	2,750	2,675

Sources: Higher Education Statistics u-Cube and NCVER VOCSTATS database. 2018 VET numbers are provisional.
Note: Within the IT field, approximately 80%, 30% and 60% of the Advanced Diploma, Diploma and Cert IV graduations are, respectively, in Computer Science; the rest, including all Cert III qualifications are in Information Systems.

The more detailed breakdown of VET completions in Engineering is shown in Table 2. For both Advanced Diplomas and Diplomas, only *Aerospace Engineering and Technology* has an increase in completions over the period, likely to be due to increased aircraft or aviation regulation.

No branch of Engineering has an increase in Certificate IV completions over the period recorded. For Certificate III qualifications, several fields show increases (most notably *Aerospace Engineering and Technology*). The most notable decrease is in *Automotive Engineering and Technology*. Some of the smaller trends may be masked by the large drop in unclassified (0399) completions.

Table 2 VET Completions by branch of Engineering, 2015 and 2018

Branch of Engineering & Related Technologies	Adv Dip		Dip		Cert IV		Cert III	
	2015	2018	2015	2018	2015	2018	2015	2018
0301 - Manufacturing engineering & technology	128	113	387	133	3,687	1,421	4,235	2,426
0303 - Process and resources engineering	49	42	379	286	1,828	1,105	9,355	10,288
0305 - Automotive engineering & technology	0	0	34	22	1,485	965	15,642	8,051
0307 - Mechanical and ind. engineering & technology	255	162	272	195	1,621	784	5,745	4,293
0309 - Civil engineering	125	45	214	87	1,171	546	7,491	8,581
0311 - Geomatic engineering	64	67	189	161	180	138	182	121
0313 – Elec. and electronic engineering & technology	542	255	271	175	1,954	1,769	8,682	7,708
0315 - Aerospace engineering & technology	114	18	606	747	498	271	1	395
0317 - Maritime engineering & technology	42	30	164	67	598	206	1,140	1,274
0399 - Other engineering and related technologies	12	16	68	37	1,537	1,607	9,767	3,862
Total	**1,334**	**745**	**2,576**	**1,908**	**14,563**	**8,808**	**62,239**	**47,003**

Source: NCVER VOCSTATS database

VET Enrolments 2015 – 2018

The data in Table 3 shows clearly that VET enrolments in Engineering for all qualification levels are dropping steadily, whereas those for HEd qualifications are steady. There was a similar trend for the VET qualifications in Building except for Advanced Diplomas. In Information Technology, Diploma enrolments have declined as Bachelor degree enrolments have grown.

Table 3 Domestic Enrolments in Engineering, Building (VET only) and IT

Field of Education / Qualification	2015	2016	2017	2018
03 - Engineering and related technologies				
HEd Bachelor degrees (inc. Hons)	52,737	52,705	51,905	52,270
HEd Dip, Adv Dip & Assoc Deg	3,938	3,687	3,575	3,598
VET Advanced Diploma	3,767	3,545	3,445	2,780
VET Diploma	8,296	7,875	7,624	6,989
VET Certificate IV	47,585	37,223	32,443	25,908
VET Certificate III	249,945	222,921	232,869	209,559
0403 Building				
VET Advanced Diploma	540	832	977	1,095
VET Diploma	15,272	15,037	12,416	10,251
VET Certificate IV	30,607	31,064	29,683	25,124
VET Certificate III	84,530	78,397	83,551	81,141
02 Information Technology				
HEd Bachelor degrees (inc. Hons)	24,755	25,482	28,628	30,590
HEd Dip, Adv Dip & Assoc Deg	945	1,114	1,365	1,598
VET Advanced Diploma	1,998	2,155	1,718	1,183
VET Diploma	19,980	21,237	10,227	5,182
VET Certificate IV	8,740	8,777	8,830	9,183
VET Certificate III	15,312	13,748	13,596	12,438

Sources: Higher Education Statistics u-cube and NCVER VOCSTATS database. 2018 VET numbers are 'preliminary'.

The declining number of enrolments in VET Advanced Diplomas and Diplomas in Engineering has not been picked up by increasing enrolments in sub-degrees.

A more detailed breakdown of the VET enrolments in Engineering for 2015 and 2018 is shown in Table 4. These data reinforce the previous observations made about the declining trends in completions in almost all areas except *Aerospace Engineering and Technology*. Most noteworthy are the halving (or more) of the Certificate IV enrolments in areas related to manufacturing, mechanical and automotive engineering and technologies, given that the skills provided in these areas would be expected to contribute to transformation of Australia's manufacturing towards *Industry 4.0*.

Table 4 VET Enrolments by branch of Engineering, 2015 and 2018

Branch of Engineering & Related Technologies	Adv Dip		Diploma		Cert IV		Cert III	
	2015	2018	2015	2015	2018	2018	2015	2018
0301 - Manufacturing engineering & technology	816	582	1,537	551	10,474	3,717	14,837	10,299
0303 - Process and resources engineering	126	131	718	806	7,996	4,340	32,318	30,038
0305 - Automotive engineering & technology	0	0	376	48	4,879	2,012	60,846	48,121
0307 - Mechanical and ind. engineering & technology	717	636	1,458	977	9,382	4,656	25,594	22,786
0309 - Civil engineering	208	133	630	429	2,643	1,497	48,341	28,003
0311 - Geomatic engineering	80	103	554	414	441	409	386	287
0313 – Elec. and electronic engineering & technology	1,594	1,045	1,299	782	5,595	4,159	46,095	45,397
0315 - Aerospace engineering & technology	38	31	1,209	2,638	1,471	899	38	706
0317 - Maritime engineering & technology	148	95	355	162	838	335	2,630	2,627
0399 - Other engineering and related technologies	30	19	173	191	3,863	3,892	18,858	21,290
Total	**3,767**	**2,780**	**8,296**	**6,989**	**47,585**	**25,908**	**249,945**	**209,599**

Source: NCVER VOCSTATS database

VET Programs and Occupations

The VET system offers a huge number of programs. They are characterised by being competency-based and directed to specific occupations, rather than designed as a curriculum to deliver a set of graduate attributes, as is the case in school and higher education.

The Joyce Review of the VET System, published in March 2019, lists all the VET qualification and training packages available, against headings that loosely align with the fields of education:

Automotive Retail, Service and Repair (up to Diploma)
Aviation (up to Adv Dip in *Aviation (several options*))
Business Services (*Project Management* Cert IV and Diploma)
Construction, Plumbing and Services (up to Grad Dip in *Building Surveying*)
Property Services (up to Grad Dip in *Building Design*)
Defence (inc. Cert IV and Dip in *Test and Evaluation*)
Information and Communications Technology (up to Grad Cert in *Telecommunications Network Engineering*)
Maritime (*up to Adv Dip of Maritime Operations – Engineer Class 1 to 3*)
Manufacturing and Engineering (Cert III *Industrial Engineering – Electrician*)
Metal and Engineering (all levels, up to Grad Dip in *Engineering*)
Manufacturing (Cert III to Adv Dip in *Manufacturing Technology*)

Manufacturing (Cert I to Cert IV in *Process Manufacturing*)
Sustainability (inc. Cert IV and Dip in *Environmental Monitoring and Technology*)
National Water (up to Dip of *Water Industry Operations*)

Chemical, Hydrocarbons and Refining (up to Adv Dip of *Process Plant Technology*)
Plastics, Rubber and Cablemaking (up to Adv Dip of *Polymer Technology*)
Pulp and Paper Manufacturing Industry (up to Dip of *Pulp and Paper Process Management*)
Resources and Infrastructure Safety (up to Adv Dip of *Civil Construction*)
Transport and Logistics (up to Adv Dip of *Electrical Engineering, and others*)
Electrotechnology (up to Adv Dip of *Electrical Systems Engineering, and others*)
Gas Industry (up to Adv Dip of *Gas Supply Industry Operations*)
Electrical Supply Industry (ESI)- Generation (up to Dip of *ESI Generation in several options*)
ESI – Transmission, Distribution and Rail (up to Adv Dip of *ESI Power Systems Operations*)

The VET statistics include mappings of programs to occupational outcomes. Table 5 shows these for area of relevance to Engineering and IT, for the sub-degree qualifications awarded in 2015 and 2018. As elsewhere in this report, these data show reductions in the numbers of graduates over the three-year period. The reductions in the numbers of completed awards for the occupational group *31 Engineering, ICT and Science Technicians* is very high. Note also that programs at all levels, including Cert III, are assigned to 'professional occupations'.

Table 5 VET Completions by Occupation Group, 2015 and 2018

Occupation Group (ANZSCO)	Adv Dip		Diploma		Cert IV		Cert III	
	2015	2018	2015	2018	2018	2018	2015	2018
23 Design, Engineering, Science and Transport Professionals	808	493	1,385	987	945	460	1,476	1,545
26 ICT Professionals	632	487	1,214	1,133	109	1,074	0	0
31 Engineering, ICT and Science Technicians	1,214	898	5,036	2,803	19,727	12,925	9,976	5,970
32 Automotive and Engineering Trades Workers	19	0	122	224	2,031	896	12,044	8,774
33 Construction Trades Workers	0	0	1	0	834	625	13,605	13,724
34 Electrotechnology and Telecomm's Trades Workers	2	2	34	59	1,825	1,574	8,608	7,701
Total	**2,675**	**1,880**	**7,792**	**5,206**	**25,471**	**17,554**	**45,709**	**37,714**

Source: NCVER VOCSTATS database

Concluding Remarks

Clearly, enrolments and graduations into Engineering-related sub-degree VET programs are in decline. Employers and their peak bodies (such as the AiGroup) are aware of these trends and are working with government to increase student take-up, primarily of the traditional trades and apprenticeships to support infrastructure construction, and of programs for future manufacturing.

Diploma and Advanced Diploma VET qualifications in engineering are clearly in decline. Neither are Associate Degrees growing rapidly, and as ACED members know well, these are used primarily as pathways to degrees. Major thinking in both VET and higher education (and industry) is needed to redesign and resource one-year and two-year post school technical qualifications that have appropriate balance of knowledge and skills for defined and needed occupations.

The recent history of 3-year degrees in engineering is not a happy one either, in terms of producing graduates for defined engineering technologist occupations. These qualifications have gravitated to being largely pathways to BEng(Hons) awards. It is high time to reconsider, with industry, the revival of genuinely occupational and industry-focussed Engineering Technology degrees that would meet students' aspirations for a sound platform of education in engineering, delivered in a shorter time than is possible for the dominant, professional engineering Bachelor (Honours) degree.

R W King
12 Nov 2019, updated 25 Mar 2020